The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Chemicals at the Fair

THE most cheerful thing about the chemical section of the British Industries Fair, opened at the White City on Monday, was the evidence on every side of better trade and steadily improving prospects. The positive satisfaction, it is true, varied in degree, from a mere feeling of relief that the worst had been passed to one that prosperity had already been recovered. Of actual dissatisfaction, of which one heard a good deal twelve months ago, hardly a trace remained. Though the purpose of the exhibition is not the transaction of actual business so much as general advertisement and propaganda, inquiries began to come in on the opening day, and by the end of the second week the orders booked will probably amount to a respectable figure. The optimistic tone was common to all departments, and to firms of every class.

In heavy chemicals this country has long held its own safely, and at the head of this section was the magnificent exhibit of the United Alkali Co., justly proud of a century of steady progress. In this matter the company sets a good example. It could probably well afford to miss the exhibition, if the matter were viewed from a purely selfish standpoint; but a great commercial position carries with it unwritten obligations, and the action of such concerns as the United Alkali in joining in a co-operative demonstration strengthens the reputation of British chemistry, and acts as a stimulus and encouragement to smaller firms.

Similarly in the dyestuffs field the remarkable exhibit by the British Dyestuffs Corporation, surrounded by the products of numbers of other British firms, must impress the visitor, whether expert or layman, with the national enterprise and resource behind such achievements. Sir William Alexander, who, when he undertook the chairmanship of the company was admittedly entering on an anxious task, might be excused some feeling of pride at having kept this great organisation intact through a period of exceptional difficulty and trouble. The reports from all quarters were promising, and with a revival in the textile industry, which absorbs so great a proportion of the dyestuff output, business must inevitably improve. The quality of home-produced dyestuffs is steadily being put beyond doubt; and gradually the various firms are discovering the lines that suit them best and giving them more intensive study. In fine chemicals, again, no one could see the range and the quality of new products without realising the substantial progress already made and the vital importance of such a national industry.

The chemical plant section was good as a beginning, but it is clear that it was only a beginning. The location of the section precluded the introduction of any really heavy plant, and many firms were content with plans and illustrations of their products. Already some exhibitors are speculating on the possibility of a separate chemical plant exhibition organised from the manufacturers' own resources for next year, and possibly some opinions may be obtained on the point during the course of the fair. Two notable features were the exhibition of the much-discussed Plauson mill, and of a quantity of enamel-jacketed ware built to the recently-adopted standard specifications. So far as one can learn, British chemical plant is not much affected by either German or American competition, and the increasing attention given to sound design and construction and good materials indicates an increasingly strong position for British manufacturing firms. On the whole the chemical sections at the fair mark a very decided recovery since that of a year ago.

Reinforced Concrete Problems

THE popularity which has been gained by ferro-concrete for nearly all forms of construction in chemical and industrial works is one of the most remarkable features of the past five years. From the standpoints of strength and durability reinforced concrete appears to satisfy almost all requirements, and its only disadvantage is, perhaps, that if subsequent alterations are decided upon they may be found to involve extremely troublesome work. So far as ordinary chemical engineering is concerned it would seem, from the frequent inquiries which we receive, that the two problems uppermost in the minds of those who are considering ferro-concrete structures are the means for rendering the material acid-proof and water-proof. With regard to acid-proofing methods our readers cannot do better than refer to the report on bituminous coatings which was issued by the United States Bureau of Standards in 1920. In this report the substances which are applicable for coatings were classified as paints, enamels and mastics, the first-named consisting of bitumen or coal-tar pitch thinned with a solvent, the enamels comprising high melting-point bitumens admixed with a finely divided siliceous filler, while the mastics are mixtures of hard asphalt, siliceous fillers, and carefully graded coarse sand or aggregate. The most satisfactory method seems to be the application in the first instance of a coat of fairly thin bitumen, and after this has been allowed to dry to a tacky condition the mastic is applied hot in several layers until it gives a total thickness of about one inch.

The satisfactory and permanent water-proofing of cement is a matter which requires particularly careful attention for the reason that in practice one frequently finds that a method which proves effective in one case may fail in another. If ordinary concrete is properly made it is so nearly impermeable that, unless submitted to heavy pressure, access of water is almost precluded. It is always as well to bear in mind that concrete to be permanent must be impervious, for calcium hydroxide and the other products of the hydration of cement are decomposed by water; accordingly, if the texture is loose trouble will in all probability be experienced. Only recently Professor A. H. White, of Michigan, announced the results of experiments in connection with the water-proofing of concrete which he has been conducting for the past ten years. Even if concrete is, so to speak, impervious to water, the latter will, nevertheless, go through it by colloidal action, and no matter how correctly the concrete is mixed the colloidal action will inevitably take place. Professor White's experiments on ordinary and waterproof concrete blocks of various types consisted in studying the rapidity with which water was absorbed by the blocks and the rapidity with which the water rose due to the capillary action. Calcium hydroxide was found to give calcium carbonate after the solution had evaporated, and this seemed to produce a waterproof surface to the concrete, and the block was found to be just as porous after the surface of the concrete was ground off. In other words, calcium hydroxide actually assists in the absorption of water, and the block becomes waterproof on the surface. Treatment in this way is characterised as negative water-proofing as distinguished from the positive methods of applying surface coatings of, for example, asphaltic materials; but a point which remains to be made perfectly clear is the actual effect if any, of such processes on the compressive strength of the concrete.

Tar Distillers' Programme

OCCASION was taken at the annual dinner of the Tar Distillers' Association, held at the Hotel Russell, London, on Tuesday, to emphasise the importance of the industry to the nation and the need of keeping the organisation at the highest possible level. Founded 38 years ago to promote the general interests of the tar trade, the Association has done much work of national importance. The intimate connection between tar and the chemical industry hardly needs to be pointed out. During the war tar was a principal part of the basis of our explosives supply, and in times of peace such industries as pharmaceutical chemicals, dyestuffs, and disinfectants are largely dependent on it. The present crisis in Europe is a good illustration of the vital importance of tar to the nation's trade. France has banned the export of tar from the Ruhr to the German dye factories. It is estimated that about £200,000,000 worth of British manufactures depend for their existence on dyestuffs made from tar, and but for British tar distillers this great volume of trade would in the present European situation be coming to a standstill.

At Tuesday's gathering the keynote was supplied, as it often is, by Dr. Carpenter, who, in proposing the toast of "Roads," pleaded for the establishment of a recognised specification for the quality of tar for road use, so as to combine the least measure of inconvenience with the greatest number of advantages. A few minutes later another speaker, Mr. Shrapnell Smith, produced a copy of the new specification for road tar mutually agreed upon between the Association and the Ministry of Transport. This will go far to standardise the quality of road tar, by which the great industry of road transport has been so immensely benefited in recent years. The same speaker referred to the possibilities of bitumen, and dropped a hint that eventually some method may be discovered of combining the advantages of tar and bitumen for the surface treatment of roads. Mr. F. E. Bristow, an acknowledged authority on the subject of roads, supported the idea of development on more and more scientific lines. Mr. W. N. McIlravy supplied a convincing picture of the great part which tar has played in road traffic development in the United States, and Mr. S. A. Sadler, the chairman, in a particularly breezy speech, paid a notable compliment to the services of the merchant class, singling out Mr. Walter Waugh, who was present, as one of the best types of British merchants, and as a good representative of the class with whom manufacturers could work with mutual advantage.

Isotopic Elements

IT will be remembered that periodically an international committee reports on the best representative values of atomic weights and such kindred matters of international importance to the theoretical chemist. A representative committee is now sitting for this

purpose, consisting of M. Georges Urbain (Paris) as president with Messrs. F. W. Aston (Cambridge), G. P. Baxter (Cambridge, U.S.A.), B. Brauner (Prague), A. Debierne (Paris), A. Leduc (Paris), T. W. Richards (Cambridge, U.S.A.), and F. Soddy (Oxford), as members. The foundations of theoretical chemistry being at the present time deepened and consolidated by the theory of isotopic elements, the first report of this committee, dealing with this subject, is of more than passing interest; and has now been published in Paris, by l'Union Internationale de la Chemie Pure et Appliqué, 49 Rue des Mathurins. It is in very concise form and consists mainly of two tables of information, with explanatory matter, the first dealing with isotopic, the second with radio-active elements.

The first table contains the 33 elements, up to mercury, which have so far been examined, 18 of which possess isotopic modifications. Elements are to be described as "simple" or "complex" according as their atoms are equal in mass or not, the old symbol being retained for ordinary use, while, if a particular isotope is referred to, the atomic mass of this is added as an index to the symbol. Thus magnesium (Mg) has the isotopes Mg^{24}, Mg^{25}, Mg^{26}. The isotopes of lead are not included as these fall naturally into the second table of radio-active elements. In this table the elements are arranged in three series, viz., Uranium—Radium—Lead; Uranium (?)—Actinium—Lead, and Thorium—Lead. The radio-active constants, half-decay periods and other information are tabulated for each modification. The principal changes are in nomenclature and are only tentative. Thus the radio-active gas, Niton or Radium Emanation, will be known as Radon. The similar emanations from Actinium and Thorium are named Actinon and Thoron. The further report of the committee will be awaited with interest.

E. P. Haslam

READERS of THE CHEMICAL AGE, especially those associated with its earliest days, will hear with sincere regret of the death, which took place at Hove on Monday, of Mr. E. P. Haslam, who acted for the first few months as general manager of this journal and had much to do with the arrangements for its production. Mr. Haslam, who was well known in the advertising world and much liked for his cheerful and friendly qualities, had been associated with the *Gas World* on its commercial side from 1894. When John Allen and Co., the company owning that journal, amalgamated with Benn Brothers, Ltd., in 1916, he became one of the directors of Benn Brothers, Ltd., and continued to serve on the board until a breakdown of health necessitated his retirement about three years ago. Since then he had resided on the South Coast, and though precluded from any active share in business he was able to enjoy his leisure and to cultivate many social interests. Many of our readers will share the sincere regret of his old colleagues at his too early departure, as well as their sympathy with the wife and devoted companion who survived him.

The Cambridge Meetings

ALREADY the provisional arrangements for the annual meeting of the Society of Chemical Industry at Cambridge in June have begun to take shape. This year's meeting promises to be of rather an exceptional character, as during the same week the Union Internationale will also meet in Cambridge. As at present arranged the Union will probably hold its sittings on Monday, June 18, and the following two days, while the meetings of the Society will probably occupy the remaining three days of the week. The character of the programme will be more academic than industrial, supplying in this respect a marked contrast to the Glasgow meetings of last June, and the engagements of the week will be of a leisurely and social rather than of the usual strenuous type. There will be no visits to works, nor any excursions; the city itself, with its collegiate and social attractions, has resources which should compensate for any loss in this respect. Each organisation will arrange an official dinner; a few lectures on scientific subjects will be delivered by well-known men; and there will probably be some receptions and pleasant social gatherings. Already a week at Cambridge in mid-June begins to look attractive.

Points from Our News Pages

Special notes and photographs are published of the chemical and allied exhibits at the British Industries Fair (p. 194).
Organic accelerators were dealt with by Dr. H. P. Stevens in the last of his Cantor lectures (p. 205).
Suggestions for the fuller utilisation of the chemist's knowledge in the inspection of goods were offered at a meeting of the Institution of Engineering Inspection (p. 206).
A new type of apparatus for the recovery of solvents was described at Manchester on Monday (p. 207).
Business is stated in our London Market Report to have been quite active this week, with prices well maintained and a lively export inquiry (p. 216).
According to our Scottish Market Report there are numerous offers from the Continent for forward delivery (p. 219).

The Calendar

Feb. 19 to Mar. 2	British Industries Fair. Daily, 10 a.m.—6 p.m.	London and Birmingham.
Feb. 27	Hull Chemical and Engineering Society: "Indicating and Recording Instruments." C. F. Newton. 7.30 p.m.	Hull Photographic Society's Rooms, Grey Street.
28	Royal Society of Arts: "Heat-Resisting Glasses." Professor W. E. S. Turner. 8 p.m.	John Street, Adelphi, London.
Mar. 1	The Chemical Society: Ordinary Scientific Meeting. 8 p.m.	Burlington House, London, W.1.
1	Society of Dyers and Colourists (West Riding Section): "The Development of Fast Dyes." J. I. M. Jones.	——
2	Society of Chemical Industry (Manchester Section). Joint meeting with the Liverpool Section: "The Progress of the Chemical Industry in Great Britain since 1914." Dr. H. Levenstein. 7 p.m.	Textile Institute, Manchester.
2	Society of Chemical Industry (South Wales Section): Annual Meeting. 7.30 p.m.	Technical College, Cardiff.
5	The University of Birmingham Chemical Society: Address by H. L. Lampitt.	The University, Birmingham.

Photographs at the British Industries Fair

The British Industries Fair of 1923

Notes on the Chemical, Dyestuff, and Chemical Plant Exhibits

Good as the Chemical Section of the British Industries Fair of 1922 was, that of 1923, opened by the King and Queen at the White City, London, on Monday, was admittedly many degrees better. It was larger, including in addition to heavy and fine chemicals and dyestuffs, a new section consisting of chemical plant. The exhibits were grouped with better effect, the larger ones occupying the centre of the hall, and the smaller the two aisles. In the matter of design and colour schemes the exhibitors had obviously benefited by the experience of last year, and the trouble and cost expended on the stalls indicated a creditable public spirit and a pride in reputation. The stands occupied by the products of the dyestuff firms were brilliant with coloured fabrics dyed with British products, and set out with excellent judgment and taste, while the various chemical substances, shown in polished glass cases and bottles, distinguished, like themselves, by an almost sacramental purity and cleanliness, looked extremely well in the brilliant artificial light. The Association of British Chemical Manufacturers, who were generally responsible for the organisation of the chemical section, and the individual exhibitors, without exception, are equally to be congratulated on the thoroughness, good taste, and public spirit of their work.

There was an impression that the King and Queen might, as last year, begin their tour of the Fair from the Shepherd's Bush end, in which case they would have passed direct into the Chemical Hall. They made their entrance instead from the Wood Lane End, and by the time they reached the chemical section they might reasonably have been excused for feeling a little tired. But there was no suggestion of weariness in their appearance. At the entrance to the chemical plant section they were met by Sir Max Muspratt, chairman of the United Alkali Co., and Mr. W. J. U. Woolcock, and with their party (which included Sir Philip Lloyd-Greame, President of the Board of Trade, and Sir W. Joynson-Hicks, head of the Overseas Trade Department, and members of the staff of both Departments) were conducted through the hall.

At the foot of the steps leading down into the Chemical, Hall, their Majesties temporarily parted company; Sir Max Muspratt conducting the Queen along one aisle and explaining the principal features of the exhibition, and Mr. Woolcock taking the King down the other. They were obviously impressed with the many evidences of progress in the mysterious key science in which Britain is now successfully challenging Germany, and each noted features of interest. The King's eye was early caught by some exhibits of Hopkin and Williams, Ltd., and he particularly noted a tube of mesothorium. A few yards further away he turned into the stand of the British Dyestuffs Corporation, where Sir William Alexander and others awaited him, and had explained to him some of the company's latest products. The fine stand adjoining of the United Alkali Co. also attracted attention, and other exhibits were briefly noted as they passed on to the exit. The King and Queen both looked in excellent health and spirits, and before leaving, the King declared to those about him that the Queen and himself had found the visit full of interest, and that they regarded the exhibition as likely to be of immense advantage in the development of British trade.

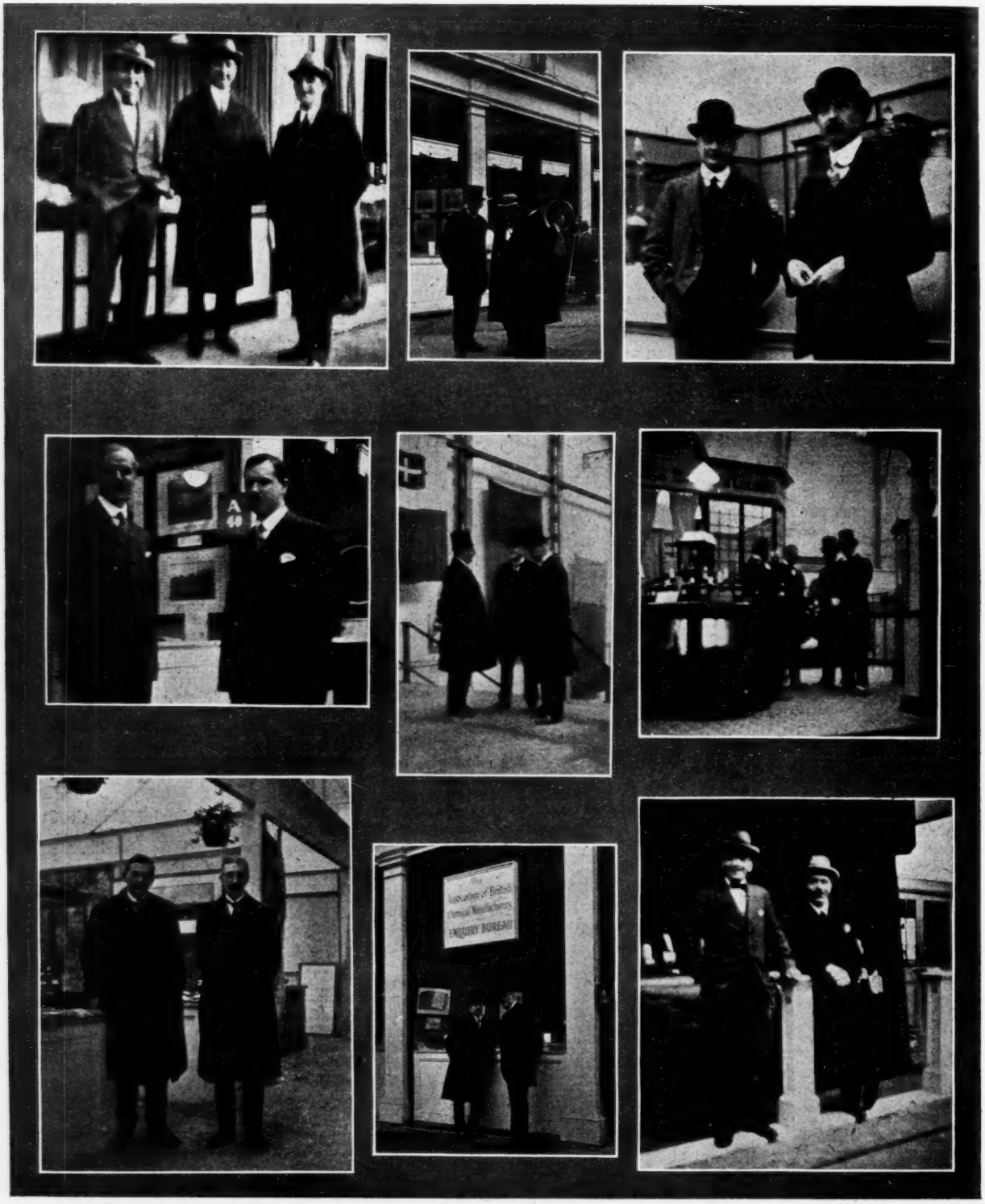
The Royal visit over, people soon settled down to the business of the Fair, and the tone generally was optimistic. On every hand one heard reports of better trade, and instances were frequently quoted in which British industry was benefiting from the Ruhr occupation, which seems to be affecting German production, and from the Safeguarding of Industries Act. Sir Max Muspratt, who has never been a pessimist, took a very hopeful view of the chemical section, and believed that the exhibition represented the right policy of making British products better known. The exhibit this year struck him as a decided improvement on the previous one, the exhibits being better arranged and the whole section making a very creditable show. Sir William Alexander, another early arrival, was obviously well pleased with the very fine exhibit of the Dyestuffs Corporation. He pointed out in the course of a short chat that the dyed goods exhibited were all dyed with B.D.C. colours, and represented actual commercial applications of the home dyestuffs industry. Trade, he admitted, especially in textiles, was still bad, though not so bad as at one stage, and with improvement in that industry the trade in dyestuffs must automatically improve. In any case, the public had before them evidence of what had been accomplished in making the industries of this country independent of foreign colours. On every side one heard favourable opinions about the exhibits, and as on the last occasion, it is certain that managers and salesmen will appreciate the opportunity of exchanging notes.

Last year, by common consent, the chemical section was the most distinctive feature of the Fair; this year it is certainly not less so. In the rest of the exhibition the various trades run one into the other without any very notable dividing line. The chemical exhibition, once again, gains greatly from the fact that it is a complete unit in itself. The Shepherds Bush entrance admits the visitor directly into the hall, which is completely occupied with chemicals and dyestuffs. At the top of the stairs leading out of this hall the chemical plant stands are arranged on either side of the gangway. The visitor, whether entering or leaving the exhibition, thus gains a definite impression of chemical industry as a natural possession.

The central feature of the chemical exhibits is the Stand of the British Dyestuffs Corporation, which appropriately reminds one of the key position of the industry. In its layout it suggests almost a modern villa; the arrangement of colours is excellent (all supplied by the company), and at each corner neatly lettered texts call the visitors' attention to the national importance of the industry. Adjoining is the brilliantly decorated stand of the United Alkali Co., whose centenary occurs this year, and is made good use of in the decorative scheme. Next to this is the British Alizarine Co.'s exhibit, and beyond that the South Metropolitan Gas Co. In the other direction are the fine chemical firms, ending with very handsome stands by the British Drug Houses and A. Boake Roberts and Co. Along the sides of the hall are grouped a number of other well-arranged stalls. Some of the very small ones which were present last year have disappeared, and the general effect gains in dignity by the increased size and improved arrangement of the stands that remain.

The exhibition is confined to British manufacturers, and Chas. Page and Co. have the distinction of being the only merchants whose name appears in the chemical hall. They are represented on two attractive stands as sole

Photographs at the British Industries Fair



selling agents for the Southdown Chemical Co., Birkenhead, and T. Lye and Sons, Luton. It was interesting to hear from Mr. W. G. Wilson, one of the directors, that considerable progress has been made during the past year, that the policy of concentrating on a high quality for a comparatively limited range of colours is working out well, and that the output is being steadily absorbed in British industries.

The chemical plant section is not large, but the firms represented are of a very good class. As the section occupies a gangway which crosses a railway, it has been impossible to introduce any samples of really heavy plant, but there are a number of smaller exhibits well worth attention. The stands are dealt with in detail elsewhere; it is enough to mention here the Plauson colloid mill, the first public exhibit, we believe, of this much discussed invention; numerous samples of steam jacketed pans, etc., manufactured to the recently adopted specification; aluminium ware for chemical purposes, evaporating and drying plants, and ingenious contrivances for automatic filling.

The Association of British Chemical Manufacturers have an inquiry office in the chemical plant section, with Mr. Alderton, a member of the staff, in charge.

Chemicals and Dyestuffs

The United Alkali Co., Ltd.

This Stand is one of the largest and most attractive in the section. The company needs no introduction to British industries, but three points of interest may be noted, namely: 1. It is an all-British company. 2. It is the direct descendant of the pioneers of the British chemical industry, and it has always maintained the highest reputation for the excellent quality of its products. 3. The products manufactured by this company are used either directly or indirectly by practically every important industry in Great Britain, and every department of national life—in peace or in war—is dependent upon the regular supply of such products.

The range of the company's manufactures is so extensive that it is difficult, in the space at our disposal, to mention certain of them without omitting other equally important articles, which, either as raw materials, or in the finished state, are of vital importance to British industries. Reference must be made, however, to some of the most important products, such as sulphuric acid, which has been described as the life blood of this country; caustic soda, soda ash and chloride of lime (or bleaching powder), all three of which are of such importance to the paper and textile industries that they could not exist without them, whilst caustic soda and soda ash are equally necessary for the soap and glass industries respectively.

Other articles of interest and importance are acetic acid for dyers, paint manufacturers, and cotton printers; bicarbonate of soda for druggists, mineral water makers and foodstuffs; chlorate of potash for match makers; chloride of ammonium or muriate of ammonia for dyers, galvanisers, etc; chloride of calcium for ice manufacturers; hydrochloric acid, which is used to an enormous extent by galvanisers, wire makers, cotton printers, etc.; sulphide of sodium for tanners and the dye industry.

Another branch of the company's activities is devoted to the supply of disinfectants, such as chloride of lime, recommended by the Ministry of Health for the treatment of water supplies, chloros (a chlorine disinfectant which has been used for many years by municipalities and public bodies throughout the country; and liquid chlorine, the use of which is increasing steadily for the sterilisation of water. Agriculture continues to be the chief industry in this country, and the company are the largest manufacturers in Great Britain of superphosphates and other fertilisers.

The domestic or household trade of the country is largely dependent on this company for the supply of materials such as salt, soda crystals and other cleansing products, which form a special feature of the company's exhibit at the British Industries Fair. This exhibit, which is one of the largest in the Chemical Section, shows samples of all the products of the company. Specimen packages of various kinds are also shown, so that traders may see the actual containers in which various goods will be supplied to them.

Another feature of the exhibit is a specimen of the apparatus by means of which liquid chlorine is applied to the sterilisation of water.

Of particular interest in showing how a company which has always been looked upon as pre-eminently of an "inorganic" nature can develop its resources into other branches of the industry, is the exhibit of organic chemicals and dye-intermediates. Some twenty years ago, when this firm were making benzol and other coke oven by-products, they entered into the manufacture of monochlor and dinitrochlorbenzols and have remained the foremost makers of these products to the present day. With the advent of war and the demand for high explosives, dinitrophenol was made on a scale of almost 100 tons weekly and of the highest degree of purity. Since the war and with a view to aiding as far as possible the stabilisation of an organic chemical industry and particularly the dye manufacturing side, commercially pure ortho and paranitrochlorbenzols were added, and from the latter paranitrophenol was evolved. Benzyl chloride and benzoic acid have been made by the United Alkali Co. for some three or four years, and the production of acetic anhydride of high strength and free from sulphur was of particular interest to drug makers. Other essential chemicals for colour makers as antimony pentachloride, anhydrous aluminum chloride, sulphuryl and thionyl chlorides, are also shown. The more recent additions to this company's range of intermediates include ortho and parachloraniline, dichloraniline and its sulphonic acid, parachlorphenol and para-nitro-ortho-amidophenol.

Finally, by way of demonstrating the attention continually given by the company to the development of the industry, it may be desirable to mention that since the war a large power station has been erected in Widnes in order to ensure an adequate electric supply not only for immediate, but also possible future needs of the company, for the electrolytic manufacture of the heavy chemicals, which form one of the chief foundations of British industry.

British Dyestuffs Corporation, Ltd.

A card on the strikingly decorated stand of the British Dyestuffs Corporation, Ltd., explains that the exhibit is intended to show the national necessity of dyestuffs as a key industry. The exhibit is one of the outstanding features of the Chemical Section and it literally comprises a miniature exhibition in itself. By means of a series of showcases on the outer sides of the stand the development of the British dye industry is traced from Perkin's mauve (1856), magenta (1864), Green's primuline (1887) etc., down to the very latest British discovery, ionamines, which, as our readers are aware, were discovered last year in the B.D.C. laboratories.

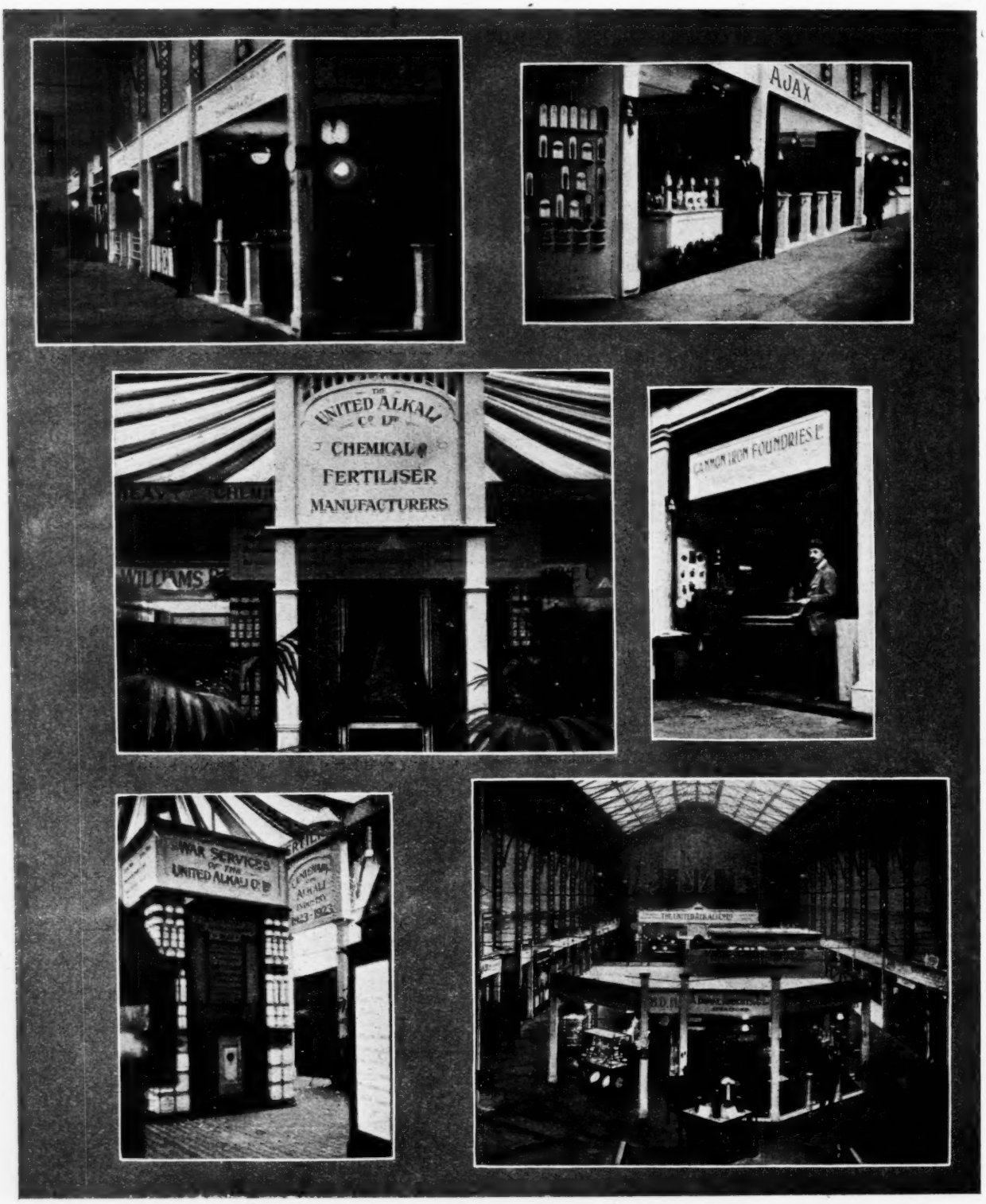
The major portion of the exhibit consists of samples of an extremely wide range of manufactured goods dyed with the Corporation's dyes, and among which may be mentioned felt shoes, glace kid, straw and felt hats, feathers, wallpaper, calico, buttons, suede, stockings, etc.

Other interesting exhibits include examples of lake colours prepared from British dyes on wrapping and other papers, duranthrene colours on various fabrics, and of cellulose acetate silk articles dyed with the new ionamine series. One of the interesting applications of these dyes is illustrated in fabrics which have been subjected to a two-colour dyeing simultaneously in one bath.

It is of interest to note that the paint on the pavilion, the linoleum on the floor, and the products of something like 30 industries displayed in the cases of this exhibit, were all coloured with British-made dyes.

The propaganda side has not been neglected, and several large cards emphasing the importance of a British dye industry are to be seen at intervals round the stand. One of the cards states that "the German dye manufacturers to-day are combined into one huge trust, representing in 1921,

Photographs at the British Industries Fair



1,875 million marks capital. This year this capital is being doubled. As a key industry it represents a menace to our national welfare." Another card, headed, " British industries can now rely on British made dyestuffs," gives figures showing how our imports of dyestuffs have fallen from 367,884 cwt. in 1913 to 57,591 in 1922.

In addition to the ordinary textiles, leather and similar trades, attention is drawn to the corporation's exhibit of fine chemicals, medicinal chemicals, microscopic stains, photographic chemicals, and rubber accelerators, which they are showing for the first time at the British Industries Fair.

T. Lye and Sons: Southdown Chemical Co., Ltd.

It is perhaps best to deal with these two stands together, since Messrs. Chas. Page and Co., Ltd., are sole selling agents for both firms, and the stands form a good example of the policy which is now being more widely adopted by manufacturers of placing the sale of their products in the hands of old-established distributing houses who are highly organised for selling, and are thus able to secure the widest market at low cost to the manufacturer.

The stand of Messrs. T. Lye and Sons is attractively decorated in royal blue. In the centrepiece is a counter of black and white upon which is a glass cases containing examples of the application of Messrs. Lye's products. In the centre of this counter is an electrically lighted " Aurolite " globe, while around this are arranged samples of sodium sulphite, bisulphite, pyro phosphate, both in the crystal and anhydrous form, blanc fixe, and hydrogen peroxide. In the centre cases are contained examples of most textile and vegetable fibres, such as human hair, bristles, exotic leaves, Japanese and Chinese straw hat braids, artificial and natural silks, etc., bleached with Messrs. Lye's well-known " Crossed Keys " brand of hydrogen peroxide. The lay-out of this exhibit is particularly striking, showing on the one hand the raw products in their untreated state and on the other the same articles after bleaching with " Crossed Keys " brand hydrogen peroxide, and ready for the manufacturer.

The Southdown Chemical Co. have a corner stand, and this shows two counters on the respective gangways. The stall is strikingly draped in the finest woollen material, showing the exceptional purity of shade of two of this company's well-known colours—namely, Azo Naphtharene Red G, and Naphtharene Acid Black, giving an artistic two-colour effect. The counters are draped with black velveteen, and upon them are shown a complete range of hank dyeings of naphtharene, benzarene, neochrome and phorochrome colours; these names being the company's respective registered names for colours for acid wool dyeing, cotton dyeing, after-chroming wool and chrome dyeing wool by the one bath process.

A range of leather dyeings is shown, amongst which must especially be mentioned a very fine example of leather black on chrome tanned calf with a hematine bottom, and also straw and felt dyeings in various bright shades. The phorochrome colours are well represented by a series of balls of loose wool, and hanks of acetyl cellulose, while the textile range is completed by some very attractive cotton prints. Other examples include the application of " Southdown " colours to the preparation of lakes, and also a demonstration of the perfect solubility of these anilines.

An interesting collection of samples of intermediates is also on view, illustrating the fact that this company produces the whole of their colours from intermediates made in their own works. It may be added that every exhibit shown, including even the draperies and the ropes, is dyed with the " Southdown " colours by the courtesy of various of their customers.

Scottish Dyes, Ltd.

This firm may be said to hold a somewhat unique position in the dyestuffs industry on account of its specialisation in the production of fast colours, and the careful attention given to the needs of dye users is nowhere better illustrated than at their stand. On the research side the firm have been making considerable progress, one recent example being the production, a short time ago, of Caledon Jade Green, a fast bright green which the makers claim to be superior to any bright green vat dyestuffs made in Germany. At the stand are to be seen the firm's Caledon vat colours for cotton and Solway wool (acid alizarine) colours and carpets, tapestries and other textiles, showing the application of the dyes. Among the exhibits which are now shown for the first time are Caledon Yellow 3 G and Caledon Brown G, both cold dyeing vat colours, the first of which gives slightly greener shades than Caledon Yellow G. Another new colour is Solway Cyanine 3 FL, a level-dyeing colour giving shades similar to Solway Blue B, and particularly suited for dyeing costume cloth, carpet yarn, etc. The new brands of established colours include a Caledon Black in powder form BX and 2 BX, and Solway Blue Black 3 B, which gives black shades slightly greener than those obtained for Solway Blue Black. The majority of the old vat colours are now shown also in double strength pastes. The firm's activities will soon be further extended on the completion in the near future of their new factories at Grangemouth, which are planned on modern lines.

Gas Light and Coke Co.

One of the first stalls to meet the eye on entering the chemical hall is that of the Gas Light and Coke Co., who exhibit a complete range of their products derived from coal tar, ammonia, and cyanogen. Amongst them may be enumerated the following: the intermediates beta naphthol and salicylic acid; dehydrated coal tar, creosote, coal tar pitch, carbolic acid (liquid and crystals), naphthalene in various forms, green oil, liquid disinfectant, pyridine, benzole, toluole, solvent naphtha, xylol, black varnish, liquid ammonia, sulphate of ammonia, cyanide of sodium, yellow prussiate of soda, prussian and bronze blues.

Special attention may be drawn to the company's excellent position for the supply of beta naphthol and blues. For the production of the former an extensive new plant has been put into operation, which enables them to cope easily with any demands that seem at all likely to arise. At the same time the quality of their beta naphthol is of the very finest, and the company describe it as the equal of any on the market to-day or any offered in the past. The quality of their products in general has long been a matter for pride.

For many years the company have been producing a large and varied range of prussian and bronze blues of high-class quality. To these have recently been added a new grade of bronze blue of particular excellence and specially suitable for the manufacture of printing inks and similar purposes.

British Drug Houses, Ltd.

The British Drug Houses, Ltd., whose stand faces the entrance to the chemical plant section, have a representative display of fine chemicals for medicinal and scientific purposes attractively set out. In the catalogue of chemical products published by this company there are over 3,000 chemicals for use in research and analysis, and several hundred examples are exhibited, including all kinds of pure inorganic chemicals and a great variety of organic compounds.

Reagent Chemicals.—The selection of organic chemicals exhibited demonstrates that it is no longer necessary to resort to Germany for reagent chemicals. It is interesting to note that the B.D.H. offers to supply on request analytical data of their products, including melting points, boiling ranges, and other purity criteria of all organic substances manufactured.

Alkaloids.—A number of alkaloids are shown, including specimens of atropine alkaloid, and the various salts of atropine, also salts of hyoscyamine, homatropine, berberine, pilocarpine, hydrastine, caffeine, quinine, and theobromine.

Medicinal Chemicals.—Glycerophosphates, salicylates, lactates, and citrates are well represented. Soluble aspirin B.D.H. (calcium acetylsalicylate) is a pure white substance giving a perfectly colourless solution. The technical difficulties attending the manufacture of this salt on a large scale appear to have been overcome. Hippuric acid and the hippurates are also among the substances of which B.D.H. has pioneered the manufacture in this country. Fine samples of the acid and its salts are shown.

Pure glucose (dextrose) is given special prominence. The manufacture of this fine chemical was taken up by the B.D.H. in August, 1914, since when it has been produced regularly and in large quantities. The product is pure white, and gives a perfectly clear colourless solution. It has extensive uses in medical and surgical practice.

Cresinol is a crystalline substance, prepared by the combination of cineol and cresol, which had its origin in the B.D.H. laboratories. It has been proved to be a valuable internal antiseptic which acts as a disinfectant upon the alimentary

tract. It is a specific in the prevention and treatment of gastric influenza. Other antiseptics only recently made in in this country are thymol carbonate and thymol salicylate.

Several of the chaulmoogra oil compounds are shown. Ethyl chaulmoograte, which is the ethyl ester of the physiologically active fatty acids of chaulmoogra oil, and sodium chaulmoograte have been used successfully in the treatment of leprosy. Sodium moorhuate, the sodium salt of the unsaturated fatty acids of cod liver oil, also used in the treatment of leprosy, is exhibited.

Important additions to the series of new remedies are contramine and manganese butyrate. Contramine is a complex organic sulphur compound, administered by intramuscular and intravenous injection, and is a specific in cases of arsenical dermatitis and metallic intoxication. Manganese butyrate is used in the acute stages of the various coccogenic infections, often in conjunction with contramine.

Duogen, a chemically pure and stable solution of hydrogen peroxide, manufactured in the company's works, is a feature. This preparation is characterised by its freedom from irritating properties if used as a mouthwash, and for other medical purposes.

Standard Microscopic Stains.—That the manufacture of stains for microscopical and bacteriological work is no longer a foreign monopoly is evidenced by the display of pure dyes of standard and constant composition for use in microscopy. It is claimed that the B.D.H. standard stains possess a high degree of purity and contain no organic or inorganic diluent. In this respect they appear to be superior to the foreign stains upon which microscopists were formerly dependent. Other requisites for microscopical work, such as mounting media, embedding materials, and liquids of known refractive index, etc., are shown.

Indicators for the Determination of Hydrogen Ion Concentration.—A number of dyestuffs are used as indicators for the determination of acidity or alkalinity in accordance with the latest researches in this branch of chemical investigation. The B.D.H. are manufacturing over 40 indicators for the determination of hydrogen ion concentration through a range of P_H values from 1·0 to 13·0. The actual colour changes of a number of the indicators at their critical hydrogen ion concentrations are illustrated by means of buffer tubes mounted in an illuminated board. The B.D.H. Universal Indicator for determining quickly the approximate P_H of a fluid is of special interest. This mixed indicator has a range from 3·0 to 11·0, and shows the whole of the spectrum colours from red to violet in the correct order.

The company issues a chart of hydrogen ion concentration data which cannot fail to be useful. Copies of this chart are offered gratis to any professor or teacher requiring them for distribution among students.

B. Laporte, Ltd.

An interesting display of chemicals is to be seen at the stand of B. Laporte, Ltd., who are perhaps best known in the trade as manufacturers of peroxide of hydrogen, in the manufacture of which they may be said to hold a unique position. It is largely due to their efforts that the potentialities of this effective, though harmless, bleaching agent have been recognised; some of its uses are demonstrated by means of a number of interesting specimens.

In the early stages of the war the company began to manufacture barium peroxide, which, as is well known, is the chief raw material used in the manufacture of peroxide of hydrogen. In the face of great difficulties they have developed the process at Luton, erected new works, and have now a plant which they claim is unsurpassed by any other maker in Europe or America.

In addition they are showing barium hydrate; barium carbonate; barium sulphite, and barium sulphate (paste or powder).

An interesting feature of the exhibit is sodium sulphide, which, we understand, is made by a process used exclusively by Messrs. Laporte, which yields a product of exceptional purity.

A sample of perborate of soda, largely used in the cotton and laundry trades, is of particular interest owing to the growing appreciation of the properties of this material.

The firm also manufacture hypochlorite of soda; bisulphite of soda; pyrophosphate of soda; chromic acid; formic acid; anti-mould; and ozone.

A special section of the exhibit contains specialities relating to the laundry trade.

A. Boake, Roberts and Co., Ltd.

Amongst the exhibits displayed on the stand of A. Boake, Roberts and Co., Ltd., are included "Abrac" sodium sulphite pea crystals and "Abrac" sodium bisulphite powder. Both products are claimed to be of an exceedingly high grade of purity, and represent a big advance over the grades previously offered. The sodium sulphite crystals test 99 per cent. minimum, and are uniform, brilliant crystals. The sodium bisulphite commercial powder hitherto offered as testing 60/62 per cent. is now shown in a form containing 63/67 per cent. SO_2. This product is being specially prepared for the rubber industry, and very large supplies will shortly be available.

A large number of important organic products are being exhibited, and these include a special series of chemicals for the perfumery and soap trades. An important range of solvents and intermediates is also included, and particular attention is drawn to the exhibits of menthol and thymol which are now being manufactured at Stratford. The exhibit also includes liquefied sulphur dioxide, sulphurous acid, sulphites, bisulphites and metabisulphites, the firm's usual high standard of purity being fully maintained.

Messrs. Boake, Roberts and Co., are the sole distributing agents for Messrs. Shawinigan, Ltd., and are exhibiting a number of the products manufactured in Canada. These include acetic acid (glacial and 80 per cent.), paraldehyde (commercial and B.P.), aldehyde of ammonia, butyric acid, etc. Much importance is attached to the exhibit of Shawinigan Black, which should meet with particular interest, as this Canadian product is fast becoming an important competitor of American gas carbon black.

Premier Filterpress Co., Ltd.

On the same stand as Burt, Boulton and Haywood, Ltd., the Premier Filterpress Co., Ltd., are showing a small working model of their "Premier" mill, together with a number of extremely interesting samples of the work accomplished by the mill.

The advantages claimed for it over the usual machine or combination of machines are many and varied, one of the most important being that there are no grinding surfaces to wear, as the whole of the disintegration is carried out by hydraulic force. This practically eliminates all wear and tear in the machine and brings the power required for driving down to a minimum. It has no gear wheels, and is driven direct by belt.

The manufacturers state that this mill should be of great interest to all manufacturers in regard to problems of the following nature: The perfect emulsification of liquids and semi-solids; the intensive mixing of liquids and solids; the minute disintegration of solids suspended in liquids; the extraction of oils; the extraction of fibrous tissues; the manufacture of paints and enamels from soft pigments; the manufacture of printing ink; the regeneration of milk from milk powders, and the production of cream; the rendering of certain soft metallic ores into a flocculent suspension; and the wet grinding of organic chemicals. It can also be used as an aid to the dissolving of soluble substances which are normally difficult to handle, such as casein, milk powders, etc., and for the acid or alkali washing of benzoles, naphthas, petroleum, etc.

Burroughs, Wellcome and Co.

Special prominence is given at the stand of Burroughs, Wellcome and Co., to the "Wellcome" bismuth salts, products which attain an exceptionally high standard of purity and remarkable chemical and physical uniformity. Equally notable are the "Wellcome" sodium salicylate, physiologically pure, in non-caking flakes, and the larger number of alkaloids and alkaloidal salts issued under the same brand. Of the many other medicinal preparations shown, one of the most interesting is "Moogrol," a promising therapeutic agent for use in combating leprosy. Though but recently made available for general use, "Moogrol" represents the outcome of patient and laborious investigations dating as far back as

1904. In its finished state, as exhibited, "Moogrol" is a limpid, colourless oil (presenting a mixture of esters of acids of the chaulmoogric series), suitable for intramuscular and intravenous injection.

A display demonstrates the successive stages in the production of "Kharsivan" and "Neokharsivan," the all-British preparations which, as proved alike by experimental investigation and clinical trial, successfully replace salvarsan and neosalvarsan.

Details of the preparation of "Tabloid" gland products and of "Iodicin," an organic combination adapted for the intensive administration of iodine, are also shown. Displays of sera, vaccines and tuberculins, of microscopic stains, and of a host of "Tabloid" and "Soloid" products further illustrate the wide range of this firm's activities.

Albright and Wilson, Ltd.

Compounds of phosphorus for all purposes form the principal feature of the stand of Albright and Wilson, Ltd., who, it is interesting to note, have been established in "The Phosphorus" at Oldbury since 1844. White and amorphous phosphorus is naturally much in evidence, the special care expended in their manufacture as standard products of a high degree being extended also to the packing. The white phosphorus is put up in standard packages in wedges or sticks, the amorphous variety being distributed in a dry powder. Scarlet phosphorus, or, as it was called, Schenk's phosphorus, had been manufactured by the firm at Oldbury, and they can also recall the production in large quantities of hydride of phosphorus (solid) P_4H_2, a monumental technical achievement of the late Dr. E. W. Wheelwright. Phosphorus compounds made by the firm include phosphorus sesquisulphide, P_4S_3, and phosphorus pentasulphide, P_4S_{10}.

In regard to ammonium persulphate, the firm claim to have created a new standard of purity and stability, the crystals being from 99·5 per cent. to 99·9 per cent. pure. They are stable in air and can be packed in ordinary paper bags with impunity. The ammonium persulphate powder, samples of which are also shown, is prepared from the standard crystal to pass 130 mesh. Other samples shown included ferric sodium pyrophosphate, glacial phosphoric acid, exsiccated sodium phosphate, and carbon tetrachloride. An interesting feature of the exhibit is a representation of a battery of concentrators for the manufacture of chemically pure phosphoric acid.

Williams Brothers and Co.

Established in 1877, Williams Brothers and Co. are among the oldest manufacturers of aniline dyes in the United Kingdom, specialising principally in dyes and stains for leather, boot polish, varnish, ink, soap, confectionery, jute, silk, wool, cotton, etc., and they claim that they can match any shade that may be required on any material.

Their principal production, even before the war, was nigrosine, and in this they were able to compete with the largest German manufacturers, as they were regularly supplying firms in Germany in competition against the Germans. This product is produced either in the base form or soluble in water, spirit, fats, wax, etc., and is used for a variety of purposes, such as for the dyeing and staining of leather, colouring of varnishes, polishes, waxes, leather dressings, staining of wood, etc.

In addition to the fairly extensive range of dyes they were making before the war the firm have since added a large number of new colours, including orange I. and II., carmoisine, azo rubine, naphthol green, bordeaux extra, acid yellow G., roccelline, etc., which they are showing on their stand, both in the dry state and in solution; various fabrics, etc., coloured with the dyes illustrate the effects produced. The firm's recent research work has led them to take up the manufacture of "Typophor" colours, originally made only in Germany, for doubletone and photogravure work, and with these and the wide range of Linsol colours which they have been making for many years past they claim to be able to meet practically all the requirements of the printing ink manufacturers.

Graesser-Monsanto Chemical Works, Ltd.

Among products exhibited by the Graesser-Monsanto Chemical Works, of Ruabon, are specimens of phenol, ice crystals, with a crystallising point of 39/41° C.; pure cresylic acid; ortho-cresol, 29/31° C.; meta-cresol, 98/100 per cent.; and para-cresol, 32/34° C. The last-named product is now being extensively used as an intermediate in the manufacture of certain dyestuffs, and also as a starting-point in the production of para-cresol methyl ether, para-cresyl acetate (principles of Cananga essence) and other synthetic products. In regard to the ortho-meta- and para-cresols, the company point out that they are probably the only firm combining the large scale manufacture of these products with such a high degree of purity. A soluble cresol or lysol manufactured by this company for many years under the name of "acrosyl," consists of a mixture of cresols saponified by appropriate combination with sodium or potassium salts of fatty acids. It is claimed to be richer in its cresol content than many types of lysol on the market, and to have a higher bactericidal and lower caustic effect owing to its unusually high content of meta-cresol and to the correct balance of ingredients of which it is composed.

Other prominent exhibits included Saccharin-Monsanto (insoluble); Vanillin-Monsanto, 100 per cent., pure crystals; salicylic acid, B.P. and technical; coumarin; para-chlor-phenol; ortho-chlor-phenol; aurine spirit; aurine, soluble; and a pure pyridine, the quality of which is claimed to be of a remarkably high order.

Hickson and Partners, Ltd.

A novel method of exhibiting product samples of the range of intermediate products and dyestuffs they manufacture has been adopted by Hickson and Partners, Ltd. The showcase containing the samples is in chart form illustrating the flow of materials through the different processes. Having their own acid plants and benzol refinery, this firm are able to start from the crudest of raw materials. The stages of manufacture are illustrated by the arrangement of the samples of the various intermediate products and dyestuffs made. The bulk proportion specialities of this company are mirbane oil, aniline oil and di-nitro-chlor-benzene. During the past twelve months the company have devoted much time to the production and isolation of pure ortho and para-nitro-chlor-benzene, and show samples of the very highest purity drawn from bulk.

A striking curtain giving access to an inner office is made up of material dyed by the three dyestuffs in which the company specialise—Magenta, Soluble Blue, and Vidal Victory Black. A good show of dyed patterns on all types of fibre is made inside, and inspection is facilitated by the provision of an excellent colour-matching lamp. Interesting samples of the crystallising of magenta are shown in the form of the firm's trade mark on the centre of the stand, and a crown.

W. J. Bush and Co., Ltd.

As the company are probably the largest manufacturers of vanillin in this country, it is not surprising that this substance figures prominently in the interesting display of W. J. Bush and Co., Ltd., which is under the care of Mr. Kelly. Another feature is the range of solvent ethers used in the lacquer and varnish industries as solvents for nitrocelluloses, acetcellulose, ester gums, camphor, triphenyl-phosphate, phenyl acetate and gum resins. Essentials oils are shown in an almost bewildering variety. The terpeneless oils shown include the oils of lime, lavender, lemon, bay and bergamot, while others noted on the stand were red thyme, otto of rose, amyris, and ambrette. A delightful perfume is possessed by the ambre orientale, samples of which are shown. Samples of artificial violet oil are also worthy of note.

In addition the company are showing a very wide range of fine chemicals manufactured at their works. Many of these had formerly to be obtained from Germany. Among the principal products shown are the acetyl salicylic, anisic, benzoic, butyric, salicylic and sulphanilic acids, anhydrous aluminium chloride, amyl acetate, anethol, benzaldehyde benzyl acetate, cream of tartar, ethyl acetate, ethyl aceto-acetate, eucalyptol, eugenol, and iso-eugenol, geranyl acetate, heliotropine and terpineol.

Brotherton and Co., Ltd.

The front portion of the stand of Brotherton and Co., Ltd., is occupied by specimens of naphtha, benzol, ortho- and meta-cresol, pale and dark cresylic acid, pyridine, "hydros" "laundros," disinfectant fluid emulsified with cresylic creosote, carbonate of ammonia, liquid ammonia, 880°, etc. Products used in the textile trade and exhibited here include hydro-sulphite of soda, "formosul," leukotrope W for discharging indigo, and "zinc formosul" for stripping colours. The hydro

sulphite of soda is available in a comestibles quality for bleaching sugars, syrups, edible fats, etc., and in a strength suitable for use in connection with pharmaceutical products. Samples of glucose and of syrups, before and after bleaching, add to the interest of this section.

Inside the stand are some striking samples of prints with patterns discharged with " formosul " and fast colour prints with hydrosulphite of soda on voile. Special attention is drawn to the exhibit of metachrome colours, the applications of which are shown on wool yarn and slubbing. Specimens are also to be seen of the firm's fast colours on yarns.

Thomas Morson and Son, Ltd.

In the stand of Thomas Morson and Son, Ltd., is a jar containing Dr. Hodgkinson's reagents as used in his patented process for the removal of sulphur compounds and other impurities from mineral oils and spirits. " Osmo-Sil," an amorphous silica claimed to be of great purity and fineness, prepared by the electro-osmose process, is also attracting considerable attention. It is particularly adapted for absorbing large proportions of liquids, it being stated that even when mixed with an equal weight of water the " Osmo-Sil " still remains a " dry " powder.

" Osmo-Sil " has a selective action on a mixture of dyestuffs. It will, for instance, absorb basic dyes, leaving behind the acid dyes. It can also be used as a catalyst carrier, and in some cases as a catalyst itself.

Other exhibits include some fine crystals of pure iron alum, chlorophyll solution, guaiacol, potassium iodide, chloralamide, chlorbutol, sodium antimony tartrate, etc.

Intermediates and Explosives, Ltd.

At Stand A 30, Intermediates and Explosives, Ltd., of Middlesbrough, are displaying a short but representative range of dyeware intermediates, and it is interesting to note that this firm which, by the way, is a subsidiary company of Messrs. Bolckow, Vaughan and Co., Ltd., is able, in co-operation with the parent company, to produce finished intermediates from its own raw materials. The products manufactured include, of course, pure benzole, pure toluol, nitro-benzene and toluene, mirbane oil, nitric and sulphuric acids, naphthalene in various forms, anthracene, and numerous derivatives of the benzene, toluene and naphthalene series.

At this stand will also be found numerous specimens of Messrs. Bolckow, Vaughan and Co.'s well-known " Newfield " silica and firebrick refractory materials. In addition to the standard lines, the company are showing their Silica Gas Retort and also special shapes designed for coke oven construction, etc.

Paterson Engineering Co., Ltd.

By permission of the United Alkali Co., Ltd., the Paterson Engineering Co., Ltd., are exhibiting on a portion of the Alkali Co.'s stand their Paterson Chloronome for the chemical treatment of condensing water for the prevention of algoid and similar fouling of condenser tubes. The Chloronome is a device for administering chlorine in measured doses. The reagent used is the pure chlorine gas compressed to liquid form, contained in steel cylinders, and costing about 5d. per lb. The advantage of this arrangement is that it dispenses with the need of the auxiliary machinery required for the electrolytic production of chlorine or the making of solutions of standard strength from such a variable substance as hypochlorite of lime. The instrument is of substantial construction, and the valves and fittings in contact with the gas are of silver and special alloys. The acid seal and connections to the chlorine absorption tower are of glass, vulcanite and rubber.

Thomas Tyrer and Co., Ltd.

A very comprehensive range of pharmaceutical and industiral chemicals is attractively displayed on the stand of Thomas Tyrer and Co., Ltd., which, it is interesting to note, is under the care of Mr. C. Lye, who has been associated with the company for over 56 years. In addition to bismuths, citrates, ethers, hypophosphates, mercurials, scale preparations, cobalt salts and iodides, the company are showing several new salts of a distinctly interesting character. The remarkably fine specimens of bismuth crystals are also arousing wide interest.

The company also supply acetic, benzoic, chromic, hydrobromic, hydrocyanic, lactic, nitric, oleic and tannic acids, and a large number of fine and technical chemicals.

Frederick Allen and Sons (Poplar), Ltd.

In addition to an interesting array of samples of their general chemicals, Frederick Allen and Sons (Poplar), Ltd., are again showing their lead chromes, which are made in three grades—yellow, middle, and deep. Products such as driers, gums, oils, and metallic salts for the paint, varnish, printing, linoleum, rubber, and oil cloth industries are prominently displayed. An extensive range of " Ivy " glues, made by this firm, covers the whole adhesive field. A decolorising carbon, known under the name of " Bullclar," is now being handled exclusively in this country by Messrs. Allen and Sons.

Ajax Aniline Dye Manufacturing Co., Ltd.

The exhibit of the Ajax Aniline Dye Manufacturing Co., Ltd., consists of a collection of dyed materials of all kinds, including textile materials, leather of all sorts, artificial silk, silk, cotton, jute, straw, etc., dyed with the products manufactured at the company's works. They are also showing intermediates—a branch of the trade which they have recently opened up and in which they claim to be able to offer exceptionally fine quality. They have largely increased their range of aniline colours, which, together with the intermediates, considerably increases the range of products.

Burt, Boulton and Haywood, Ltd.

Coal-tar and ammonia products and disinfectants are a prominent feature of the striking display made by Burt, Boulton and Haywood, Ltd., who show samples of sulphate of ammonia, benzole, toluol, solvent and heavy naphtha, crude carbolic acid, cresylic acid, pyridine bases, creosote of various grades, naphthalene, refined and dehydrated tars, etc. Prominence is given to the company's " Ialine " series of disinfectants and to their " Silvertown " wood preservative.

Bowdler and Bickerdike

The tendency towards specialisation noticeable in many of the exhibits in the Chemical Section of the Fair is again illustrated in the exhibit of Messrs. Bowdler and Bickerdike, who are showing some fine specimens of carbolic acid, in ice crystals, detached crystals, and in liquefied form. The dark, 95 per cent., pale, 97 per cent., and water-white, 98 per cent. varieties of cresylic acid are also to be seen together with Lysol, sheep dip, and various disinfectant fluids.

Gray's Dyes and Colours, Ltd.

Alizarine colours, basic and direct cotton colours are shown by Gray's Dyes and Colours, Ltd., who also make a speciality of their nigrosines. A good selection of intermediates is shown in addition to chrome liquors and carbonate of lime. Inside the stand are cartoons illustrating in an amusing manner the manufacture of " acid drops in a chemical works," and of " alizarine from beetroots."

Mr. J. L. Rose

Gallic acid and pyrogallic acid continue to be the chief products made by Mr. J. L. Rose, and samples are exhibited on the stand of various grades of these acids. Gallic acid is shown in the technically pure anhydrous state, other qualities being chemically pure and technically pure. Although it has not yet been placed on the market, a jar of resublimed pyrogallic acid is also shown.

South Metropolitan Gas Co.

The first stand which meets the eye on entering the hall from the Uxbridge Road entrance is that of the South Metropolitan Gas Co., which contains a wide range of coal tar distillates, intermediates, and inorganic chemicals. Sulphate of ammonia of the dry neutral quality is given a prominent place.

British Alizarine Co. Ltd.

The British Alizarine Co. have a very attractive collection of colours, with many samples of their application to fabrics, etc. Important progress has been made during the year in several directions, of which a fuller account may be given in our next issue.

The Chemical Plant Section

THE Chemical Plant Section, though limited in size, includes a number of representative firms. Of the eleven stands three are occupied by seven members of the British Chemical Plant Manufacturers' Association, namely, Manlove, Alliott and Co., Nottingham ; Leeds and Bradford Boiler Co., Stanningley ; Widnes Foundry Co., Widnes ; W. Neill and Son, St. Helens Junction ; W. C. Holmes and Co., Huddersfield ; Bennett, Sons and Shears, London ; and the Aluminium Plant and Vessel Co., London. Two stands are occupied by the exhibits of the Roberts' Patent Filling Machine Co., Bolton, and the remainder by the Kestner Evaporator and Engineering Co., London ; T. and C. Clark and Co., Ltd., Wolverhampton ; Wm. Everard Davies and Co., London ; W. J. Fraser and Co., Dagenham ; the Cannon Iron Foundries, Ltd., Wolverhampton; and Plausons' Mill and Filter Press, Ltd., London ; and Mather and Platt, Manchester.

Kestner Evaporator and Engineering Co., Ltd.

On the stand of this well-known company are exhibited a good collection of their evaporating and similar plant, among which may be noted the following :—

The Kestner climbing film evaporator, for the evaporation or concentration of ordinary liquors, is a most simple and useful apparatus. This type of evaporator is used extensively in the concentration of sugar solutions, gelatine solutions, all classes of glues, caustic soda, tan extracts, milk, malt extracts, glucose for the production of distilled water for power houses, distillery wash, bi-sulphite liquors, wool-washing liquors, dyewood extracts, meat extracts, bichromate of soda, bichromate of potash, hyposulphite of soda, etc. In addition, this climbing film type is specially adapted for high concentration as, for instance, the finished product for meat extracts, where it is necessary to get a practically solid extract for domestic use. It is also used for finishing dyewood and tan extracts in the solid form and many similar applications. It has the advantage that it can be adopted in multiple effect without vacuum so as not in any way to deteriorate or injure the most delicate product.

In the Kestner system of salting type evaporator, dual and triple salting solutions are easily handled, as, for instance, the concentration of a dual solution containing sodium chloride and sodium nitrate. By working in double effect the sodium chloride can be removed from the separator of the first effect and the sodium nitrate from the second effect. Very large installations of this type of evaporator were put down during the war, and in one of the Government stations the largest installation of evaporators that has ever been operated in any one works was entirely composed of Kestner type evaporators.

The Kestner evaporators are not made in large units only, as special attention has been given to the small size apparatus ; and, in fact, Kestner's were the originators and inventors of the small type evaporator known as the Kestner horizontal evaporator. This evaporator is very popular throughout chemical works where relatively small quantities of liquor have to be evaporated. The evaporator is so designed that it can be used for both salting and non-salting liquors. It is a highly economical type machine, and even though it is small, advantage is taken in the design of this apparatus to utilise the vapour that leaves the separator in order to heat up the incoming liquor, thus giving very high efficiency. In chemical works this type is rapidly replacing the old-fashioned method of utilising steam coils in tanks, which not only occupy an enormous amount of space, but are not so efficient and, due to the escaping vapours, cause great trouble to the fabric of the building in which they are situated. During the war thousands of these evaporators were installed.

The company have taken over the silica gel process for Great Britain and the Colonies, and considerable interest was shown in the process, which is applicable to the following uses :—(1) Absorption from the liquid phase—refining of kerosene, gasolene, benzol, paraffin wax and lubricating oils ; (2) absorption from the gaseous phase—alcohol from the air, acetone from the air, SO_2 from the air, dehumidifying of air, CO_2 from the air ; (3) as a catalyst ; (4) as a carrier for catalyst—silica gel being impregnated with any metal or metallic oxide to be used as a catalyst.

The firm's output also includes pans and degassers and purifiers for boiler feed.

Plausons' Mill and Filterpress, Ltd.

The colloid mill, exhibited by this firm, jointly with the manufacturers, Mather and Platt, attracted considerable notice. Hitherto technical information concerning the mill has been a little restricted, and those interested had a good opportunity of seeing, on the removal of the front plate, the simple interior mechanism, while detailed specifications were exhibited on the walls. The charge capacity of the mill is 3·3 gallons and the output capacity up to 380 gallons per hour.

Apart from the general design and structure, attention was particularly attracted by the revolving beaters. In the lower portion of the cavity of the mill there is arranged a rotating shaft carrying a number of beaters or hammers arranged at eight points round the circumference. These beaters are formed of blades of a high quality of steel and they are securely keyed on the shaft with distance pieces between them of rather greater thickness than the blades of the beaters themselves. Above and below the axis of the revolving shaft carrying the beaters there are fixed in the body casing of the mill corresponding sets of fixed blades or anvils at suitable distances apart, in order that the revolving blades may pass with suitable clearance between the sets of fixed blades. The shaft carrying the beaters is of forged steel of a specially high quality, and after forging it is carefully heated to remove internal stress and to refine the crystal structure and is then oil-hardened and tempered in order to develop the maximum toughness and resistance to fatigue. It is specially designed to give great rigidity, and any sudden changes of section are avoided, so that the distribution of stress may be gradual and uniform. The whole of the rotating parts are very carefully balanced so as to ensure smooth running at the high angular speeds for which these mills are designed.

There were on exhibition a good variety of substances which had been experimentally treated by the mill, illustrating its application to superfine grinding, intensive mixing, emulsification, and colloidal dispersions. A point emphasised by the makers is that the mill represents a combination of mechanical and chemical forces.

Wm. Everard Davies and Co.

The stand occupied by this company contains various plans of the Everard Davies vertical retort system of carbonisation, which embraces high temperature gas making and coke manufacture as well as low temperature carbonisation for the production of smokeless solid domestic fuel and by-products. Although the results obtained so far are considered highly satisfactory, the results of further trials and experiments will presently be available, and a fuller account can be given. It is enough to say for the moment that the system can be applied in either its waste heat or pre-heated types, and essentially comprises twin vertical chamber retorts or ovens heated externally and internally from one side only, with a central offtake or discharge passage for withdrawing the distilled products, the heating structure being zoned or staged along the retort height into three or four compartments, so that virtually you have three to four retorts superimposed one above the other. The special design of the heating flues is such that by means of triangular flues having the base of the triangle in the retort wall, the flame of combustion of the heating gas is presented to almost the entire surface of the retort wall, thus realising the maximum possible conductive or external heating effect. This shape of flue also yields the maximum strength, solidity, stability, and durability for the minimum amount of material ; the minimum thickness of crust or side wall is also obtainable from this form of flue work. Accordingly, the transmission of heat by external means is raised to summit attainable. Alongside the aforesaid external heating method is combined an ingenious system of internal heating using flue gases, steam, or other extraneous gases like hydrogen, oxygen, air, hydrocarbons, etc. The company are also responsible for a new device for the rapid heating of water for domestic purposes suitable either for gas or coke fires.

Cannon Iron Foundries, Ltd.

This firm's exhibit comprises cast iron chemical plant lined with their special hard acid resisting enamel as supplied for the chemical industries. The enamels shown represent acid resistants, which have given excellent results to chemical manufacturers, offering great tenacity, a fine glaze with a high degree of insolubility. A further important point is the purity of the enamels, as they are guaranteed to be absolutely free from lead, arsenic, or any other deleterious ingredients.

The exhibits comprise a steam jacketed mixing still with agitator and stirring gear, multitubular vertical condenser and receiver, the whole of the interior coated with acid resisting enamel.

Two pans are shown made to the new British standards, viz., (1) deep type, 50-gall. size; and (2) shallow type, 25-gall. size. These pans have been prepared to the designs and specifications of the Association of British Chemical Manufacturers and the British Chemical Plant Manufacturers' Association, and have been approved and adopted by the British Engineering Standards' Association.

The firm are also showing the "Clayton" mixing digesters, which are supplied in a range of sizes, and very suitable for laboratory use. Being made up to 10-gallon size, a fair output can be obtained. In addition there are laboratory water baths with concentric reducing rings and water level fittings, laboratory dye baths with beakers, evaporating bowls, and a number of general patterns.

Attention is directed to a cast iron flanged pipe, 9 ft. long, the whole of the interior of which is coated with acid resisting enamel. A speciality is made of pipes for chemical works.

W. J. Fraser and Co., Ltd.

A standard oil bath heated vertical still is prominently displayed on the stand of W. J. Fraser and Co., Ltd. This type of still with working pressures up to 60 lb. can be used for ordinary distillation, with a dephlegmating column, or with a reflux condenser, and owing to its adaptability is particularly suitable for use in semi-large scale plants. Unfortunately it was not possible for the firm to show the actual large-sized stills, but illustrations of these are to be seen on the walls of the stand.

Some small-sized vertical high pressure autoclaves are exhibited which are suitable for any pressure, and which have interchangeable furnace casings, steam jackets, or oil baths, to suit the method of heating required. These autoclaves are made in sizes with capacities of from ½ to 5,000 gallons, and are of shallow pattern suitable for agitation, or of the non-agitated deep pattern.

Photographs and drawings demonstrate the wide range of the firm's activities, particularly in regard to the design, manufacture, and erection of complete plants and apparatus of all descriptions. The examples illustrated include an installation for a fertiliser works, and a nitric acid plant with 20 stills, turning out 40 tons of nitric acid per day. Other productions of the firm include furnace equipment, hot oil heating equipment, coolers of the radiator, coil, grid and multitubular types, special pumps and compressors for agitating purposes, elevators, conveyers, tanks, and special weighing and measuring equipment for solids and liquids, for use where the ordinary commercial machines are unsuitable.

T. and C. Clark and Co., Ltd.

The stand occupied by the exhibit of T. and C. Clark and Co., Ltd., Wolverhampton, the original patentees of enamelling on iron, in the section reserved for the British Chemical Plant Manufacturers' Association, shows enamelled cast iron chemical plant widely varying in type and adapted for a variety of uses in the manufacture of fine and heavy chemicals. The acid-resisting nature of the enamel, which is guaranteed free from lead or arsenic, makes it an important product, enabling the British chemist to compete in the world's markets, where purity of product is essential. The articles manufactured vary in capacity from half-a-pint to over 1,000 gallons. An important feature is the fact that plant of small size is made for research work in the laboratory, which, when completed can be made in vessels of large dimensions in commercial quantities. Stills, nitrating pans, evaporating dishes, jacketed pans, round boilers and tanks are some of the specialities to which attention is especially directed. There is exhibited a 100 gallon deep pattern jacketed pan made in accord with the design of the joint Sub-Committee ot A.B.C.M. and B.C.P.M.A. Designs of vessels with agitation arrangements are on view and are worthy of careful examination.

Manlove Alliott and Co., Ltd.

The exhibit of this well known Nottingham firm, which occupies the first stand on entering the Section, includes only one actual piece of plant—a small scale centrifuge, which, however, illustrates the high quality of the company's products. There are, however, interesting brass models—one of the Johnston Dryer, now about 50 years old, and another of the Firman Dryer. In addition illustrations are exhibited showing samples of the company's dryers for the treatment of gluten, etc., using exhaust steam rotary sugar dryer, continuous rotary dryer for crystals, fire heated dryer for sludges, continuous film cooler or dryer, vacuum dryer for drugs, colours, and hyposulphite of soda, filter presses for colour works and for hollow cool plates, experimental filter presses, evaporators for acetate of lime, tungstate of soda, and dyestuffs, and various types of centrifugal dryers. Mr. Alliott, who acts as treasurer of the Chemical Plant Manufacturers' Association, is in charge of the exhibits. He explained the absence of heavy plant to the fact that the exhibition was hardly suitable for it, and favoured the idea of a chemical plant exhibition organised by the plant manufacturers themselves some time next year, when samples of their actual products would be shown and explained.

Roberts Patent Filling Machine Co.

The machines and accessories produced by this company and used for filling almost every kind of liquid and semi-liquid into all kinds and shapes of receptacles attracted considerable interest and illustrated the very wide variety of uses to which these contrivances can be put. Among the great advantages of these machines are their labour-saving qualities, the rapidity with which all kinds of substances can be handled, and the perfect accuracy with which they work. Machines are constructed in a great variety of styles and sizes to suit the various industries, and though they are essentially intended for works where large quantities have to be handled, they are also adaptable to works of a smaller character. The output of the firm is much too diversified for a detailed description here, but any firms interested in this kind of work would find a visit to the stall profitable. In addition to the filling machines there are various types of liquid samplers to ensure a consistent standard of quality.

W. C. Holmes and Co., Ltd.

Although they are unable to show actual specimens of their plant in the space available, W. C. Holmes and Co., Ltd., have a comprehensive collection of photographs of their specialities displayed on the walls of their stand. Among the plant displayed in this manner are centrifugal washers (Liversedge and Davidson's patent), with a capacity of 6,000,000 cubic ft. per diem, "P. and A." tar extractors, Livesey washers, and illustrations of sulphate of ammonia plants with an output of from 3 tons per diem. The firm also make ammonia oxidation plants, complete installations for the recovery and refining of by-products of coal distillation, etc.

The Aluminium Plant and Vessel Co., Ltd.

This company exhibit a miscellaneous assortment of the utensils they manufacture specially for use in chemical works, including boiling pans, bowls, trays and small aluminium and copper utensils for food stuffs and chemical factories. Without going into the general merits of aluminium as against enamel, it may be pointed out that the firm claim the advantage where colour, flavour, and technical purity are matters of importance. The parts are all welded together instead of being jointed in the ordinary way and the lightness of the ware as well as its safety and durability are put forward as substantial advantages.

Leeds and Bradford Boiler Co.

On the stand of the Leeds and Bradford Boiler Co. attention is drawn to a variety of products manufactured by the firm, including concrete skeps, digesters for substances, vulcanisers and de-vulcanisers, railway wagon tanks, and jacketed pans.

Further notices of the exhibits will be published next week.

Rubber Vulcanisation Problems

Organic Accelerators

THE final Cantor Lecture on "The Vulcanisation of Rubber" was delivered before the Royal Society of Arts on Monday by Dr. H. P. Stevens, when the lecturer considered the problems connected with the use of various organic accelerators. (The previous lectures were reported in THE CHEMICAL AGE for February 10, and February 17.) It followed, said Dr. Stevens, that as the vulcanisation of raw rubber was dependent on the presence in the rubber of natural accelerators, synthetic rubber would be difficult to vulcanise without the addition of some accelerator to take the place of these natural substances. Naturally occurring nitrogenous (protein) constituents could be replaced by other forms of protein, and experiments had been carried out in which protein, or similar nitrogenous matter, was added to synthetic rubber during manufacture.

Other nitrogenous substances tried included the nitrogenous organic bases which were found to accelerate the rate of combination of natural rubber and sulphur, but the weaker bases were not efficient accelerators. He referred to the work of Spence—in regard to the use of organic bases—who had published a paper in 1913, which showed that with increasing proportions of a substance called P-D (which Dr. Stevens suspected meant piperidene) added to rubber specimens compounded with sulphur, from nil to 5 per cent. progressive increase in the rate of vulcanisation was obtained. Several of the more easily procurable organic bases were adopted experimentally, such as aniline, hexamethylene tetramine, and aldehyde ammonia. The two latter were powerful accelerators, but aniline had little or no accelerating action and had now been generally discarded. Hexamethylene tetramine, or hexamine, was convenient for use on a large scale, and was still very popular. On the other hand, aniline and aldehyde ammonia were volatile, had unpleasant odours, and the former was toxic. The same disadvantages attached to a number of the stronger bases, such as piperidene, and to overcome this difficulty endeavours had been made to prepare stable, non-volatile and odourless derivatives which would retain the accelerating effect of the original base. For this purpose use had been made of the carbon disulphide addition products, and thus, in the case of aniline, a substitute was found in thiocarbanilide.

Carbon Disulphide Addition Products

It was soon discovered that in many, if not all, cases, the carbon disulphide addition product, when used in conjunction with the zinc oxide, was more active than the base from which it was prepared. Thus, thiocarbanilide, although approximately only one-third as active as hexamine, was more active than aniline, and served as a useful accelerator on a manufacturing scale. It therefore appeared that the basic nitrogenous substances did not necessarily owe their efficiency to their activity as bases, although, as a general rule, the powerful bases such as piperidene, dialkyl amines, and similar substances were found to be more active than weaker bases. Peachey discovered that P-nitroso-dimethylaniline was a powerful accelerator, and some other nitroso compounds, such as nitroso naphthole shared this property. These nitroso-derivatives were acidic rather than basic in nature, and to explain their efficiency it would be necessary to assume that during vulcanisation the nitroso group is reduced to an amino group. This, however, would hardly suffice to explain why phenylhydrazine a well-marked basic substance, does not accelerate, but actually retards, vulcanisation. Then, again, carbon disulphide addition products, with the alcohols, were powerful accelerators, and contained no nitrogen, whilst the carbon disulphide addition product of phenylhydrazine had been examined in Dr. Stevens' laboratory, and found to be a powerful accelerator.

Use of Zinc Salts

The fact that the efficiency of carbon disulphide or similar sulphur-containing accelerators of the carbo-sulphydril type was found to depend on the presence of basic mineral ingredients, particularly zinc oxide, led to experiments in the use of the zinc salts of some of these derivatives. Bruni claimed that these zinc salts were more active accelerators than the original substances from which they were obtained, but this view was not shared by Twiss. Other metallic salts, such as those of magnesium, cadmium, and lead, had been tried, but the general experience indicated that the zinc salts are the most active of the metallic salts, and that zinc oxide is the best activator. As zinc oxide was a well-known compounding ingredient, extensively used by rubber manufacturers, it was a fortunate coincidence that this substance, and not the oxide, of some less available metal, possessed the desirable activating property to such a high degree. On the other hand, some of the ordinary compounding ingredients had the reverse effect—e.g., the metallic sulphides, and, in some instances, such common ingredients of rubber mixings as magnesia and its carbonate and bases, including the alkalis and alkaline earths.

Ultra-Accelerators

The lecturer then considered the organic accelerators in two groups: (1) the mild and moderately active substances, and (2) the very active or so-called ultra-accelerators. It was noteworthy that the ultra-accelerators produced satisfactory vulcanisation from a technical point of view at low temperatures. The number of the less or moderately active accelerators in use was small, and most of the important ones had already been referred to, but he also mentioned the di- and tri-phenyl guanidine, and also the compound of aniline and formaldehyde. Of the very active accelerators, reference was also made to the more recently discovered dithio acids and the mercapto thiazoles. A short description of the various reactions involved was then given, and it was pointed out that there is much scope for research in this direction.

An indication was then given of the long and tedious work involved in the study of the action of a single accelerator, and it was shown that although considerable acceleration of vulcanisation was obtained with hexamethylene tetramine and other accelerators of this type, in the presence of zinc oxide, the results were not of the same order as those obtainable with the ultra-accelerators mentioned, and curves were shown of the condensation product of piperidene and carbon disulphide, which indicated that, taken alone, the acceleration produced was of a mild character, maximal tensile strength being obtained in about 200 minutes, but with 1 per cent. zinc oxide this period was reduced to about 50 minutes, and with 5 per cent. of zinc oxide the maximal effect was overstepped with the first observation made. With this and similar accelerators vulcanisation could be carried out in periods as short as 5 or 10 minutes, and at temperatures of 100° C. and lower.

With reference to the effect of the addition of an accelerator in reducing the time or temperature to produce a given physical state or percentage of combined sulphur, and also as a factor in reducing the elongation when the tensile figure is at a maximum figures were given from which it followed that the state of cure as given by the maximal tensile strength would be obtained with a different elongation or coefficient according to the activity of the accelerator. Accelerators were sometimes referred to as vulcanisation catalysts, but it was doubtful whether they should be regarded as true catalysts, as a catalyst should remain unaltered at the end of the reaction, but it had not so far been found possible to extract the original accelerator from the rubber after vulcanisation, and there seemed to be good grounds for believing that the accelerator itself undergoes some change or decomposition in the process of vulcanisation.

Dealing with the theory of vulcanisation, Dr. Stevens examined at some length the chemistry of colloids. There were distinguished chemists who denied that chemical reaction had taken place, and who held that the change in the physical properties of rubber was brought about by the absorption of sulphur or sulphur chloride, as the case might be. Wolfgang Ostwald, the protagonist of the adsorption theory, had given the reasons for his views against the chemical interpretation, and Dr. Stevens gave a number of reasons for dissenting from them.

"An Extremely Good Journal"

AMONG recent letters received relating to *The Chemical Age Year Book* is one from a large American manufacturing firm at Fort Wayne, Ind., U.S.A. The letter, dated February 1, reads: "We desire to thank you for *The Chemical Age Year Book and Diary*, which we received to-day. The information which it contains will be of great service, and fills a long-felt want. We also wish to state that we consider THE CHEMICAL AGE to be an extremely good journal."

Chemical Inspection

Utilisation of Chemists' Expert Knowledge

At a meeting of the Institution of Engineering Inspection, on February 16, Mr. H. T. F. Rhodes, in a paper on "Chemical Inspection," said that strictly speaking chemical inspection began—perhaps in the forties—with the first public analyst; and it was not surprising, therefore, that in this branch (of food and drugs) the most finished system and the soundest administration was to be found. But the most important question was the modern development of chemical inspection, and in this connection we had to deal not only with the question of food and drugs, but with chemical inspection in general. The systematic analysis of food and drugs was at least indirectly one of the factors which caused the chemist to enter the works; many other factors were, of course, at work, but the manufacturer was quick to see the advantages which an examination of his own products could bestow, at worst as a protective measure.

Inspection of Goods before Purchase

Considering how chemical inspection could best be carried out, the author discussed the organisation of the average chemical laboratory and the chemists's possible uses as an inspector apart from his activities as an analyst. In the average chemical laboratory there was not the slightest doubt that an enormous amount of unnecessary analytical work was done. Chemical inspection was not mere analysis, and it could be made more efficient and greatly simplified by making fuller use of the chemist's expert knowledge. Visual inspection and inquiry as to the conditions of manufacture might, when applied by the expert, render analysis more easy to interpret, and in some cases—where rejection was concerned, of course—unnecessary. If manufacturers, when proposing to buy material were to employ their chemist in this capacity, much trouble and misunderstanding would be prevented. But this was not all; inspection of the material in bulk, whether it was analysed or not, was always desirable, and in some cases, where deliberate fraud was suspected, absolutely necessary. It frequently happened that the bulk sample differed from any that was ever received in the laboratory, and a stronger argument for inspection by a qualified person before purchase than this could scarcely be advanced. And in some cases, where there was no question of fraud, much good resulted from collaboration between the chemical staff of the producer and that of the consumer.

In laboratories which possessed a staff of some size inspection ought to be in the hands of an inspector, who would be a regular member of the laboratory staff, but, although every chemical inspector must be a chemist, a very good chemist might make a very bad inspector. Only the trained and experienced eye could arrive at any conclusion by means of inspection, but it must not be supposed that this was the only method which the inspector had at his disposal. It would be his business to ascertain in any special case the conditions under which the material to be supplied was manufactured, and not less important was the question of tests which might be applied to decide the merits or demerits of a particular product—in short, the chemical inspector ought to be the connecting link between the chemical staff of the consumer and that of the producer.

Chemical and Engineering Specifications

Specifications regarding chemical and other products requiring chemical examination differed fundamentally from many engineering specifications, in that in the latter there might be a certain latitude which the chemical specification was not usually tolerant of. This must necessarily be so, since the chemical specification dealt with composition. It was, of course, true that most manufacturers submitted some form of declaration as to the purity of the article they supplied, and it was also true that the purchaser would roughly specify his requirements, but the actual compilation of definite specifications which must be fulfilled literally, and in every particular, was the exception and not the rule, and a system of organised specifications would be advantageous to both parties.

The under development of chemical inspection had been shown to be due, in part, to a lack of appreciation of the chemist's value in industrial matters, but, in fairness, it had to be admitted that this conception was in part the fault of the chemist himself. So often the chemist's words were made of null effect, not because he lacked knowledge or training, but because in a number of cases he seemed to be lacking in that nice appreciation of human values. The salvation of chemical inspection must depend upon the chemists themselves. Chemical inspection required organisation, and this organisation was a work proper to chemists.

In conclusion, the lecturer said that chemical inspection, as much as engineering inspection, was designed to extend industry, to increase efficiency, and to eliminate fraud. The aim of the engineer, the chemist, and indeed all scientific men, was to correct, to standardise, and to improve. The Institution of Engineering Inspection pledged itself to foster and to maintain the principle that the interests of buyer and seller, popularly supposed to be opposed, could, and must, be harmonised. Scientific organisation could do this, and science was the common ground upon which the two could meet. Chemical inspection, properly carried out, would cause producer and consumer, employer and employee alike, to concentrate upon the only form of competition worthy of consideration—the competition for efficiency. If the man of commerce and the man of science combined to take care of efficiency, good business would be left to take care of itself.

A short discussion ensued, in which Messrs. N. P. P. Sandberg, F. R. Wade, H. Gutteridge, B. Spencer and A. H. Foyster took part, and to which Mr. Rhodes replied.

Rosin and Turpentine in 1922

In their annual review of the London turpentine and rosin markets in 1922, Lowden Connell and Co. state that supplies of turpentine in the year 1922 have not been plentiful in any country. During the latter months of 1921 the home demand in the United States of America had been heavy and increasing. In the Spring of 1922 it became evident that this demand was being maintained, and as the new crop did not show promise of being any larger in volume than that of the previous year, there appeared to be every prospect of a world-wide shortage. During May and June there was never much more than one month's supply of turpentine in tank in London. This position of affairs was not helped by the fact that it was impossible during the first six months of the year to obtain French turpentine at prices which would compete with American c.i.f. prices. France had enjoyed a good demand at home and from other Continental countries, and appeared to be independent of London for the marketing of her output of turpentine.

Consumers both in America and the United Kingdom were reported to be none too well supplied, and forward business—apart from purely speculative transactions—had diminished greatly. A principle of "hand to mouth" buying became prevalent. This created a steady demand, which helped to maintain prices at high levels.

During June the spot price of turpentine in London rose from 67s. to 119s. per cwt. These high prices, however, made the import of French turpentine possible, and by the middle of July London stocks were augmented by over 1,500 barrels of the French product, with further shipments expected. Prices eased off considerably during the summer months, but October found Savannah and London with rapidly advancing markets, in consequence of the prospect of supplies being inadequate to meet the probable demand over the ensuing six months. During November and December, however, the demand in America fell off considerably, and receipts from the scrape crop exceeded expectations. By this time the London stocks had been considerably augmented—both from America and France. Prices declined on both sides of the Atlantic, although the last few days of the year found the markets rising once more. It is interesting to note that the total London deliveries for the year 1922 were 84,658 barrels, as against 94,889 barrels in the previous year—a decrease of 10,231 barrels. Of the total 1922 deliveries, 11,021 barrels were French.

The demand for rosin has been steady throughout the year, and prices have not varied to any great extent. Prices of the dark grades in France have frequently been high in comparison with similar grades of American, and consequently the imports from France figure considerably under those of past years. The importation of French rosins was also often a question of Exchange rates.

The Recovery of Solvents

New Type of Apparatus Described

A PAPER on " The Recovery of Solvents " was read by Mr. T. W. Wild before the members of the Manchester Section of the Institution of Rubber Industry on Monday, Mr. J. H. Mandleberg presiding.

Mr. Wild stated that as most of the solvents used in manufacturing processes were comparatively expensive—ether, methylated spirits, acetone, naphtha and benzene—the prevention of waste had been an insistent problem and its practical and economic solution an urgent necessity, particularly in the rubber industry, in which many thousands of gallons of solvent were evaporated and lost annually. The Ministry of Munitions realised very early in the war the vital need for conserving the precious stocks of available solvents. The known recovery processes were thoroughly investigated and modifications and new ideas were introduced. In the manufacture of cordite the solvent mixture used was ether 58 per cent. to 42 per cent. of alcohol, 92 per cent. strength. The solvent vapours were condensed by bringing them into contact with an absorbent liquid and the solvents were separated and collected from the resulting mixture by distillation.

Recovery of Ether-Alcohol Mixture

For the particular purpose of recovering the ether-alcohol mixture, sulphuric acid or water and, later, cresol were tried. The quest for a more efficient and economical absorbent, one which would be effective both for ether and alcohol, resulted in the discovery of cresol as being a promising substitute, and the results fully justified the choice. As cresol in the presence of air rapidly corrodes lead the parts of the plant exposed to it were made of steel. When using the cresol absorbent 55 per cent. of the original solvent was recovered, amounting to 82 tons of solvent per week and equivalent to £282,000 annually. The outlay in erecting the necessary plant amounted to approximately £80,000.

It was observed, said the author, that an absorbent did not extract from the air the whole of the solvent when the two remained in contact, nor was a fixed quantity taken up. It usually varied with the concentration of the vapour in the air and the temperature and the time of contact of the two. The solubility coefficient of the absorbent was also affected by the rate and method of flow of the absorbent through the scrubbers. The velocity of the flow and the temperature affected the final results of solvent recovery very considerably and should be carefully controlled. Much valuable information and necessary facts could be discovered by experiments conducted on a small scale in the laboratory, thus obviating the great expense and delay which trials with the works plant always entailed. The services of the works scientific staff should be commissioned to assist in determining the best procedure for obtaining the highest results for the particular solvent used. The Americans appeared to be leading the way in the matter of solvent recovery by absorption.

The Absorption and Redistillation System

Up to the present time all the methods described for the recovery of solvents used in rubber manufacture had relied upon the direct condensation of the vapours, but, said the author, he knew that a certain large concern was utilising the absorption and redistillation system for recovering solvent naphtha. The firm bought huge quantities of the solvent. They were in a position to provide for scientific supervision of the plant and also to carry out extensive research. Those two important factors appeared to be essential to get the maximum efficiency out of the plant and to find the most suitable absorbent for the particular solvent used. The absorbent was probably creosote oil, or at least the oil after it had been subjected to some secret treatment to increase its capacity for absorbing the vapours or to facilitate the liberation of the solvent only during distillation. Mr. Earl said he was compelled to resort to a deduction of the facts from scanty particulars and general principles of the usual method. Presumably it was fundamentally identical with the process used for the recovery of the ether-alcohol mixture in cordite factories. The vapours were collected and brought into contact with the absorbent, either in a tower scrubber or some other device, and the liquid mixture of absorbent and solvent was fractionally distilled to separate the two constituents, and probably the solvent was further rectified by another distillation.

Use of Flue Gas

A recent novel idea, which originated in America and was later patented in this country, merited consideration. Flue gas, which might be cleaned by a washing or scrubbing process, was caused to flow in contact with the fabric to take up the vapourised solvent therefrom, and the resultant mixture of flue gas and solvent vapour was treated to separate one from the other. The flue gas was generated by burning any suitable kind of fuel, such as coal, coke, charcoal, wood, oil or illuminating gas in special burners or stoves. The use of flue gas coming directly from the fire for the drying of solvents was entirely impractical. In the first place, the initial temperature of the flue gas was so high that it would almost without exception injure the material to be dried; secondly, the flue gas on cooling condensed moisture, and this would injure the fabric; thirdly, the sulphur and dust in the gases would rot the fabric, owing to the action of acid on cellulose fibre, and soil it with flue dust; it would also injure the drying apparatus. It was therefore essential to use cool, dry and clean flue gases. That meant that their sensible heat was practically wasted and their use in commercial practice had hitherto been considered out of the question on that account. On the other hand, it had been demonstrated that the expense and economic waste of heat involved in the cooling and purification of the gases was justified because of the protection which their subsequent use afforded against fire and explosion. It was claimed that this apparatus was designed to recover all but a very small percentage of the solvent used in treating the fibre.

Essentials to Success

Mr. Wild summarised what he considered were the fundamental requirements of a scheme to obtain the best results. The chief points were: (1) A sufficient quantity of solvent must be recovered to show a substantial and constant profit after all expenses against the apparatus had been deducted; (2) The output of the spreading machine must not be reduced; (3) The possibility of fire must be no greater than on an uncovered machine and there should be no danger of an explosion; (4) The quality of the manufactures must be maintained.

The author, in conclusion, described an apparatus which he claimed embodied the above requirements. The drying chests of a spreading machine were covered with a close-fitting hood. About the centre of the hood was an exhaust box, inside of which was fitted a fire screen of special design. The exhaust box was connected by means of a pipe to an air circulator mounted on top of a condenser. The base of the condenser was connected to a reheater which was placed under the spreading machine. At the other end of the reheater a connecting duct was provided to convey the recirculated air to each end of the hood. The recovered solvent was separated from the air and deposited in the base of the condenser, from whence it was removed through a pipe to a storage tank and was ready for use again. Taking the average of recovered solvent to be nine gallons per day, the annual yield in 273 working days would be 2,457 gallons. At to-day's price of 1s. 9d. per gallon, 2,457 gallons of coal tar naphtha equalled £214 19s. 9d. In February of last year the charges against the apparatus were calculated, liberal allowances being made for all possible expenses during a working year period, these amounting to about £80 to-day. The annual net profit per apparatus was therefore about £135.

Discussion

The chairman, in the course of the discussion, said the question of solvent recovery was of great interest to those who used solvents in their processes, because the idea of buying expensive solvent liquids to puff them into the air and waste them was outrageous. The use of rubber solvents without recovering them was one of the greatest examples of stupidity in manufacture. Replying to some of the questions raised, the author said the recovered solvent could be used again immediately it came from the condenser. The percentage of solvent recovered varied very considerably. It could be anything from 40 to 60 per cent., according to the class of work on which the machines were being operated.

Chilean v. Synthetic Nitrate

Good Consumption Prospects

In their fortnightly nitrate circular, dated February 19, Aikman (London), Ltd., state that the arrivals amount to about 77,000 tons, and that about 70,000 tons are due during the next fortnight.

The market, during the fortnight, has continued under the influence of developments in the Ruhr, and the wild fluctuations in Continental currencies have induced consumers to maintain a hand-to-mouth policy, and only buy their immediate requirements. European deliveries for the first half of February, under the circumstances, have been very satisfactory, and amount to 80,000 tons, against 145,500 tons for the whole of February last year. Stocks at February 15 were about 242,000 tons, afloat 210,000 tons, and unshipped sales for Europe up to April 30 delivery about 115,000 tons, or a total supply in sight for Europe for arrival up to June of about 567,000 tons.

Chilean Product Cheaper than Synthetic

Prospects of consumption continue good, and the improvement in the price of sugar is likely to result in larger sowings of beet and an increased consumption of nitrate for this crop in April-May. The improvement in the German exchange coinciding with a big increase in price in German synthetic nitrogen products, which, for the first time, makes Chilean nitrate cheaper than the synthetic article, may have an important bearing on the consumption of Chilean nitrate in Germany this season, and since the increase in these prices was announced considerable purchases of Chilean nitrate have been made by German consumers.

The temporary cessation in demand, coupled with nervousness at the political position, resulted in a few arrived parcels being reoffered by Hamburg merchants. These were sold at £12 2s. 6d. to £12 5s. per ton, but with the improved demand in Germany these sellers have now withdrawn and values are about £12 10s. for due and near and £12 5s. to £12 7s. 6d. per ton for March shipment.

Producers' Sales

The Producers' Association have sold during the fortnight about 70,000 tons, of which 56,000 tons as for January–April and 14,000 tons for June shipment, making their total sales for shipment from July 1, 1922, to April 30, 1923, 1,464,000 tons, and for shipment in June, 1923, 186,000 tons. The total quantity sold by the association and outsiders for shipment up to April 30, but not shipped at 15th inst., is estimated at 220,000 tons, of which about 115,000 tons for Europe and Egypt, 85,000 tons for the United States, and 20,000 tons for other countries. The demand in the United States continues satisfactory, and of the fortnight's sales about 25,000 tons were bought for American account. The Government tender for 28,000 tons to be held on January 31 was postponed until February 14, but the result has, so far, not been reported.

Three increases in price of German synthetic nitrogen products have taken place since January 23, the latest increase being 70 per cent., and making the price of sulphate of ammonia 7,796·80 m., nitrate of soda 9,305·40 m., and cyanamide 6,991·30 m., all per unit of nitrogen per 100 kilos. At an exchange of 100,000 m. to the £, this means sterling prices of £16 per ton for sulphate of ammonia, £14 17s. 6d. per ton for nitrate of soda, and £14 per ton for cyanamide. Shortage of coal and increasing costs are said to be responsible for these big increases in price.

The Institute of Chemistry at Birmingham

It has been decided to revive the Birmingham and Midlands section of the Institute of Chemistry, which lapsed during the war. A provisional committee has been appointed, rules have been approved and submitted to the Council of the Institute for confirmation, and the following officers have been elected: Chairman, Professor Morgan, Professor of Chemistry at the University; hon. treasurer, Dr. J. N. Friend, of the Birmingham Technical School; and hon. secretary, Mr. C. A. F. Hastilow. It is intended to hold meetings of both a social and professional character, and to endeavour to promote co-operation and friendly intercourse between chemists. Mr. R. B. Pilcher, registrar of the Institute, addressed a meeting recently of Fellows and Associates of the Institute of Chemistry in Birmingham.

Borax Consolidated, Ltd.

Satisfactory Working of New Plant

Presiding on February 18 at the twenty-fifth annual meeting of Borax Consolidated, Ltd., the Earl of Chichester, in referring to the prospects for trade in their products, said their home trade had shown some improvement lately, but a rapid increase did not seem probable. Manufacturers who bought the company's products, owing to the position due to exchange, which in some countries fluctuated violently from day to day and in extreme cases even from hour to hour, had great difficulty in doing business abroad, and their business was naturally affected by this. They had had the same problem to deal with in conducting their own export business to protect themselves against serious loss owing to the extraordinary fluctuations in exchange, and in fact they had had in many instances to refuse to do business unless for payment in sterling. We were passing through one of the most difficult periods which had arisen from the war. The course of business in some of the most important Continental countries had been practically destroyed by the political conditions and consequent exchange upset.

Their company had continued to reduce selling prices as costs came down, and every effort had been made to decrease costs, both at the mines and the refineries, by the installation of up-to-date plant, and most satisfactory results have been obtained from recent additions. At the group of mines in the United States, which they were at present operating, considerable development work had been done during the year, and the reserves of ore in sight showed a very substantial increase on the previous year.

From their South American deposits they had shipped an increased amount of borate of lime during the year at a decreased cost. From their Asia Minor mines they also produced an increased quantity of ore, but these were at present shut down owing to the situation in Turkey and consequent disorganisation of the workers and the staff. Also the railways by which the company's ore was sent to Panderma for shipment was partially destroyed during the retreat of the Greeks and consequently their means of transport was interrupted. According to their Constantinople manager, however, but little damage had been done at the mines. They hoped shortly to be in a position to re-open them and to ship ore to their works. In the meantime they were filling the gap by increased supplies from their mines and deposits in other countries. The fact that they possessed properties in a number of countries enabled them to meet such a situation.

The Chemical Engineering Catalog

A very useful book of reference for the chemical engineer is the *Chemical Engineering Catalog*, published in New York at 2 dollars annually, to chemists, by the Chemical Catalog Co. The 1922 edition contains some 1,200 pages of generous size, and deals with the products of chemical manufacturers in the United States. There is a comprehensive index of manufacturers arranged alphabetically under their products, followed by what amounts to a brief technical catalogue of the various chemical engineering firms, specially produced on a uniform basis and freed from advertising matter. The usefulness of this section to chemical engineers contemplating the purchase of any item of equipment from the U.S.A. can hardly be over-estimated, since the products of all manufacturers are placed before him. The end of the book is occupied with an indexed register of technical chemical books, mainly of American and English origin.

The chief criticism against this publication is that of its very limited field from the point of view of the British chemist, who must wish, on looking through it, that there was a similar publication available for him, definitely British in its scope.

"Westminster Bank, Limited"

The resolution passed at an extraordinary general meeting of the London County Westminster and Parr's Bank, Ltd., held on the 1st inst., changing the name of the company to "Westminster Bank, Ltd.," was confirmed as a special resolution at an extraordinary general meeting held on Friday, February 16. It is proposed that the change shall take effect on March 1.

Institute of Chemistry

Interesting Paper before Huddersfield Section

At a meeting of the Huddersfield Section of the Institute of Chemistry, held on February 15, in the Physics Lecture Theatre of the Technical College, Huddersfield, Professor W. L. Bragg, of Manchester University, lectured on "X-rays and Crystal Structure." The Chairman (Dr. H. H. Hodgson), in welcoming the lecturer, said that no chemist needed an introduction to the work of Professor Bragg, but that the chemists of Huddersfield had been looking forward for some time to personal contact with him.

Professor Bragg first described crystal structure and the phenomena of crystallisation, remarking that all true solids were crystals. He then proceeded to the analysis of crystals by X-rays, and gave a comparison of the results with those obtained by microscopical investigation. The suitability of X-rays for this purpose was emphasised. Following this came a description of the light which the analyses throw on chemical composition, when the beautiful underlying architecture of crystals is revealed in its entirety. Particularly does the method afford a means of finding the distances between the atoms in the solid state.

Nature of Chemical Combination

A wider aspect of the field was then reviewed, including the nature for chemical combination and the forces of chemical attraction, while an answer was given to the question of why the properties of substances alter so completely when they are combined—*e.g.*, why is common salt so different from its constituents, sodium and chlorine. The cognate problem of the seat of atomic individuality was then described. The interesting subject of atomic and molecular dimensions next received attention, and in this respect many characteristics were explained from the standpoint of electrostatics—*e.g.*, the problems relating to heats of solution and heats of formation of substances. The final section of the lecture was devoted to the insight which the powers of X-ray analysis afford for the study of chemistry. No longer can barriers be erected between chemistry and physics, since recent work on the part of the physicist has broken the existing but always artificial boundary. The lecturer in conclusion appealed for co-operation from the chemical side.

Paint and Varnish Manufacturers' Liquidation

A meeting of the creditors of the Duroline Manufacturing Co., Ltd., paint and varnish manufacturers, Mitcham and Putney, London, was held on February 8, at 1 and 2, Bucklersbury, Cheapside, London. The chair was occupied by Mr. F. S. Salaman, who stated that the shareholders of the company had passed the usual resolution and had appointed him to act as liquidator. The statement of affairs showed liabilities of £6,390, while the assets were estimated to realise £5,000. The company was registered on June 6, 1919, with a nominal capital of £50,000. There had been issued 41,003 shares, all of which were fully paid up. Mr. Salaman stated that the liquidator of another company had taken action against the Duroline Manufacturing Co., and some months ago obtained a judgment to the extent of something like £6,000. An arrangement was then entered into under which the Duroline Manufacturing Co. were to pay to the other concern 25 per cent. of their gross profits. The Duroline Manufacturing Co. found it impossible to keep up the arrangement, and therefore voluntary liquidation was inevitable. An offer for one of the leases amounting to £400 had been received, and the liquidator was of the opinion that it should be accepted. A resolution was passed confirming the voluntary liquidation of the company with Mr. Salaman as liquidator.

Road Tar Specifications

The Ministry of Transport have recently had under review the tar specifications for surface tarring and for making tar macadam. As a result the official publication, entitled "General Directions and Specifications relating to the Tar Treatment of Roads," has been recast in consultation with representatives of the interests concerned. The specifications for Tar No. 1 and Tar No. 2 have been revised, and the methods of testing, in so far as they depart from ordinary analytical practice, have been laid down. The revised edition can be purchased from the Stationery Office, price 1s. net.

Institute of Metals

Programme of the Annual Meeting

As previously announced, the annual general meeting of the Institute of Metals will be held at the Institution of Mechanical Engineers, Storey's Gate, Westminster, London, on Wednesday and Thursday, March 7 and 8. The meeting will commence at 10 a.m. each day, concluding not later than 5 p.m. On March 7 the annual dinner of the Institute will be held at the Trocadero Restaurant, Piccadilly Circus, at 7.30 p.m. The papers which are expected to be submitted will deal with the mechanical properties of the magnesium alloys; the ternary system copper-aluminium-nickel; further studies in season-cracking and its prevention; the inner structure of the crystal grain as revealed by meteorites and Widmanstätten figures; the constitution of some alloys of aluminium with copper and nickel; tests on work-hardened aluminium sheet; the recrystallisation of cold worked cadmium; the constitution and age-hardening of the ternary alloys of aluminium with magnesium and copper; volume changes accompanying solution, chemical combination, and crystallisation in amalgams; the heat-treatment and mechanical properties of alloys of aluminium with small percentages of copper; the density and the hardness of the cast alloys of copper with tin; the modulus of direct elasticity of cold-drawn metals as a function of annealing temperature; the hardness of annealed copper; the hardness of certain copper alpha-solid solutions; the oxidation of metals at high temperatures; the structure of eutectics; some properties of the copper-rich copper-aluminium alloys; the production and heat-treatment of chill castings in an aluminium alloy.

Canadian Importation of British Chemicals

According to figures published by the Dominion Bureau of Statistics and quoted by H.M. Senior Trade Commissioner at Montreal, the share of the United Kingdom has increased in some groups of imports. Although American competition is very severe in many of the groups he is of the opinion that under improved conditions the United Kingdom share might increase still further. Imports of chemicals and allied products from the United Kingdom show an increase of 2 per cent., and now amount to 14 per cent. of the whole, while imports from the United States show a decrease of 3 per cent. and now amount to 71 per cent. Imports from the United Kingdom include medicinal and pharmaceutical preparations, aniline, and coal-tar dyes, red and white lead, blanc fixe, water-colours, oxides, fillers, zinc white, ochres, alum and compounds of aluminium and iron, ammonia and its compounds, sulphate of copper, calcium, potash and potassium compounds, soda and sodium compounds.

Abolition of Indian Indigo Cess

The decision of the Government of India to repeal the Indigo Cess Act, announced a few days ago, marks the collapse of expectations entertained during the war that, aided by scientific research, the indigo industry might recover some of its former prosperity. Much exception was taken to the action of the Government last year in failing to re-engage Mr. W. A. Davis, the Indigo Research Chemist, but the Government maintain that the industry itself should bear the cost of research work, whereas the income from the Cess had been barely sufficient to meet half the cost of Mr. Davis's establishment. Now that the Cess has been abolished any future research work on indigo will be carried out by the Agricultural Service.

German Reparation (Recovery) Act

Complaints have been brought to the notice of the Board of Trade that the receipts issued by the United Kingdom Customs Authorities for the levy made under the German Reparation (Recovery) Act are withheld by British merchants when they should be promptly dispatched to the German exporter of the goods in question. The Board of Trade wish it to be understood that the Act is intended to operate with the minimum hindrance to trade between Great Britain and Germany, and there appears to be no good reason why the Customs' receipt which represents part of the payment for the goods should not be dispatched to the German exporter without avoidable delay.

Chemical Matters in Parliament

Ammonium Sulphate Prices

SIR BERKELEY SHEFFIELD (House of Commons, February 15), asked the Minister of Agriculture whether the Government were aware that the price of sulphate of ammonia was now £16 18s. per ton, which was a considerable increase on the price last year; whether this increase was due to increased cost of production, or to the control of a profiteering combine; and, if the latter, what steps would be taken to secure justice to the farmers.

Sir R. Sanders said he was advised that the present price of neutral sulphate of ammonia (25¾ per cent. ammonia) was £16 18s. per ton. The price for the same grade in February last year was £16 13s. As the increase in price was only 1½ per cent. no special steps would seem to be necessary.

An American Institute of Chemistry

THE American Institute of Chemistry was organised at a meeting of New York chemists at 381, Fourth Avenue, on January 22. This new society aims to include only chemically trained men whose education and experience comply with the standard of the qualifications set for membership.

The Institute will work along the same lines as the Institute of Chemistry of Great Britain and the Canadian Institute of Chemistry. The organisers state that the American Institute of Chemistry will seek to perform for the qualified chemist the same service as that of the Bar Association for the lawyer and of the Medical Society for the physician. Dr. H. G. Byers, head of the department of chemistry of Cooper Union, and Dr. Lloyd Van Doren, a chemical patent lawyer, both John Hopkins graduates, are respectively president and vice-president. Mr. C. K. Simon, president of the Dye Products and Chemical Co., 200, Fifth Avenue, New York, is treasurer—the secretary is Mr. Lloyd Lamborn, the editor of *The Chemical Age*.

Committee to Investigate Silica Dust Danger

THE Home Secretary has appointed a committee (1) to inquire into the working of the Scheme for the Refractories Industries under the Workmen's Compensation (Silicosis) Act, 1918; and (2) to advise on any proposals for applying the Act to other industries which may be referred to it by the Secretary of State. The chairman is Lieut.-Colonel G. F. Stanley, and the members are Mr. R. R. Bannatyne, Dr. A. J. Hale and Sir Walter Kinnear. The secretary is Mr. E. Field, to whom any communications should be addressed.

Potash Prospecting in the United States

No fewer than 219 permits for prospecting for potash on Government lands in certain western States had been issued up to December 1 last, according to the United States Bureau of Mines, which announces that four leases for potash production, all in California, were granted. Of the potash prospecting permits, by far the largest number, 170, were in Utah; 21 were in Nevada; 14 in California; 8 in New Mexico; 3 in Arizona; and one each in Colorado, Montana, and Nebraska. The potash prospecting permits issued applied to 512,480 acres, and potash leases to 7,343 acres.

Royal Visit to London Soapworks

ON Tuesday the Duke of York paid a visit to the soap works of John Knight, Ltd., at Silvertown. He was received by Mr. J. L. Buchanan, chairman of the company, Mr. Samuel Barrett, deputy chairman, Mr. James Webster and Mr. H. E. Cobb, works managers, Mr. V. H. Poynter, and other officials. After inspecting photographs showing some of the results at the works of the Silvertown explosion, and a prize medal certificate granted to the original John Knight for a soap exhibit at the Great Exhibition of 1851 and signed "Albert" by his great grandfather, the Duke was given general information as to soap manufacture. His chief concern, however, was to see the workers in actual employment. The Royal visitor inspected the machinery used for crushing cotton seed, making cattle food, and extracting edible oils and the great tanks of oil and tallow. He met and talked with many of the workers, and saw the process of soap-boiling.

Safeguarding Act Complaints

Alleged Improper Inclusion of Formaldehyde

THE Board of Trade have received formal notices of complaint under Section I Sub-section (5) of the Safeguarding of Industries Act, that "Rochelle salts" and formaldehyde have been improperly included in the lists of articles chargeable with duty under Part I of the Act.

These complaints will be submitted in due course to the Referee appointed by the Lord Chancellor for the purposes of the sub-section, and any person interested should communicate immediately with the Assistant Secretary, Board of Trade (Industries and Manufactures Department), Great George Street, London, S.W.1.

An Institution of Welding Engineers

THE Institution of Welding Engineers, Ltd., was registered on February 13 as a company limited by guarantee, without share capital. The number of members is limited to 1,000, each liable for £1 in the event of winding up. The objects are:—To promote the advancement of the science and practice of welding by means of gases or otherwise. The management is vested in a Council, the first members of which are:—T. V. Lane, 34, Leadenhall Street, London, E.C., sales manager; W. R. J. Britton, 1, Fenchurch Avenue, London, E.C., chemical manufacturer; H. G. Dixon, 79, Mark Lane, London, E.C., mechanical engineer; R. L. Haggerty, Rocke House, Lesney Park Road, Erith, director of companies; C. Bingham, 11, Queen Victoria Street, London, E.C., merchant; L. J. Yeeman, 12, Grosvenor Gardens, London, S.W.; A. E. Knowles, New Crane Street, Chester, chemical engineer; D. Richardson, 280, St. John Street, London, E.C.1, engineer; G. Young, 17, Essex Road, London, N.1, engineer; and L. M. Fry, 106, Victoria Street, London, S.W., mechanical engineer. The registered office is at 30, Red Lion Square, London, W.C.

German Chemical Industry

ACCORDING to the monthly report of the Prussian Chamber of Commerce, communicated from Berlin to the Department of Overseas Trade the inland sales of potash in the first half of the month were not satisfactory, but thereafter visibly improved. Nevertheless they did not reach the figure of January, 1922. Foreign trade was also quiet, and business in the by-products of the potash industry left much to be desired. The truck and coal supplies were good, and there was no scarcity of labour.

In regard to the general chemical industry it is stated that the liveliest demand prevailed at home, as well as abroad. Orders from France and Belgium were only accepted on the most stringent terms as regards payment. Sales of aniline dyes, on the contrary, declined noticeably. Nearly all dye working-up industries, with the exception of the leather factories, report, to a greater or lesser extent, considerable restrictions of work. Both the inland and foreign demand for pharmaceutical products was generally satisfactory. As before, large quantities are still unfortunately being smuggled out of the country. The supplies of fuel and chemical raw materials was adequate. Raw materials, which were formerly available within the country in sufficient quantities, have now to be imported.

Antimony Lead Alloys

AMONG the papers read before the Faraday Society on Monday, was one by Mr. S. D. Muzattar dealing with antimony lead alloys. The author stated that measurements of the electric potential of the antimony-lead-alloys were made by means of a quadrant electrometer against a calomel electrode in N KOH, N Pb $(NO_3)_2$, and tartar emetic with tartaric acid solutions. The results revealed an identity of potential up to 98 per cent. Sb with that of lead, which showed the formation of no solid solution and no chemical compound between the two metals.

In a paper by Mr. Maurice Cook, M.Sc. on crystal growth in cadmium, it was shown that by annealing similar specimens of the metal at 295 C, larger and more regular and equally axed crystals were produced with prolonged heating.

From Week to Week

DURING NOVEMBER last Japan imported 683,639 lb. of acetate of lime from the U.S.A.

MR. E. R. REDGROVE has been appointed a director of Snowdon, Sons and Co., Ltd., of Millwall, London.

PERMISSION has been granted to the British Oxygen Co., Ltd., to erect a factory for the production of oxygen at Seafield Road, Leith.

THE USE of methyl alcohol in the manufacture of perfumery and cosmetics has been prohibited by the Russian Supreme Economic Council.

THE WESTERN CHEMICAL CO. of Sandyford Works, Paisley, announce that the style of the company is now "The Western Chemical Co. (Paisley), Ltd."

SEVERAL PROCESSES for the manufacture of calcium arsenate without employing the white arsenic of commerce are reported to have been discovered in America.

AN OUTBREAK OF FIRE occurred at the Monk Bridge Ironworks on February 16. This was confined to the heat treatment department, where it originated.

UNITED STATES CHEMICAL EXPORTS for December showed a decline in value of nearly half a million dollars compared with November, but were above the figures for December, 1921.

AMERICAN PRODUCTION of benzol, toluol and naphtha is reported to be increasing, but manufacturers are not yet in a position to meet fully the demand from the consuming industries.

THE LATE PROFESSOR A. CRUM BROWN bequeathed his portraits of scientific men to the Department of Chemistry of the University of Edinburgh, where he was Emeritus Professor of Chemistry.

DR. MARIE STOPES, who is well known for her work on coal, was the plaintiff in a libel action in the King's Bench Division on Wednesday, against Dr. H. G. Sutherland and Harding and Moore, Ltd., The hearing was adjourned.

AT A MEETING at Leeds on February 16, gas-coal producers protested against the growing tendency of the Gas Manager's Association to make comprehensive long date contracts, on the grounds that it was fettering to the industry.

PAPERS on "Co-ordination Compounds and the Bohr Atom," by N. V. Sidgwick; "Silver Salvarsan," by W. H. Gray; and "The Propagation of the Explosion Wave through Gaseous Mixtures," by H. B. Dixon, will be read at a meeting of the Chemical Society, at Burlington House, London, on March 1, at 8 p.m.

THE HEARING of the United States Government's case against the Chemical Foundation has been fixed for April 23 at Wilmington, Del. The action will decide the ownership of some 5,000 German chemical and dye patents which were sold to the Chemical Foundation during the war by the Alien Property Custodian.

IN AN ANNOUNCEMENT last week of a vacancy for an assistant chemist at the Fuel Research Station, it was inadvertently stated that particulars of the appointment were obtainable from the Department of Overseas Trade. The person concerned was, of course, the Secretary of the Department of Scientific and Industrial Research.

THE BRUSH ELECTRICAL ENGINEERING CO., LTD., of the Falcon Works, Loughborough, announce that the address of their London office and registered office on and after February 26 will be at 88, Kingsway, London, W.C.2. The telephone number will be Holborn 1220, and the telegraphic address will be "Magneto, West Cent."

AT a recent meeting of the University Court of St. Andrew's University a letter was read from Professor Robert Robinson resigning the Chair of Chemistry in the United Colleges as at the end of the Candlemas term, when he takes up his duties as Professor of Chemistry in the University of Manchester. It was agreed to invite applications for the vacant chair.

SIR ALFRED YARROW, in the conviction that the future prosperity of this country will be largely dependent upon the encouragement of original scientific research, and to mark his sense of the value of research to the community, has offered the sum of £100,000 as a gift to the Royal Society, to be used as capital or income for the purposes of the Society as the Council may think fit.

FOREIGN COMPETITION and generally unsettled conditions were experienced in the German chemical industry in December last, according to the reports of Prussian Chambers of Commerce. The inland demand fell off merely temporarily on the improvement of the mark, and the works are at present still fully employed. The supply of raw material from abroad was facilitated by the temporary rise of the mark.

MR. R. NUNN MAY presided at a dinner of the University of Birmingham Metallurgical Society on February 15. Speeches were made, laying stress on the importance of co-operation between the university and manufacturers, which was gradually being recognised by the latter. Among the speakers were Mr. J. Earle, Mr. A. J. G. Smout, Professor Turner, Mr. D. H. Ingall and Mr. G. W. Mullins.

DRASTIC PENALTIES for unlawful possession of or dealing in dangerous drugs are prescribed by the Home Secretary's amending Bill, the text of which is issued. Power is given to justices of the peace to grant warrants to search premises and their occupants in cases where there is reason to believe that prohibited drugs are kept or dealt in, and to seize such drugs or any document relating to transactions in them.

NEGOTIATIONS are reported to have reached an advanced stage for the erection of a further large cement works at Aberthaw, about 12 miles from Cardiff, involving an outlay of upwards of £500,000. The site is near that of the Aberthaw and Bristol Channel Cement Works. A large acreage of land is said to have been acquired by a Cardiff syndicate, who are carrying through preliminaries in connection with the new enterprise, details of which are not yet available.

THE MANCHESTER SECTION of the Institution of Rubber Industry held its first annual dinner at the Midland Hotel on February 14 when Mr. Alexander Johnston (president of the Manchester section) said he was convinced that the Institution would succeed. Whatever success had been achieved so far was due to the pioneers of the movement. Manchester was the real heart of the rubber industry of Great Britain. He hoped that all members would strive to help in the development of the Institution upon right lines, so that it would become a great force for good in the industry.

THE PEAT DEPOSITS on the Mornington Peninsula, Victoria, are to be exploited by Messrs. Ashworth, Benson, and Pease, of Stockton-on-Tees, in conjunction with a Melbourne firm. The Mornington deposits consist of decayed vegetable matter, sea shells, guano, etc., and are from one to eight feet deep over a very large area. Treatment, handling, and transport difficulties have now been overcome, and it is stated that a soluble fertiliser, rich in phosphates, is being obtained from the deposits; by-products such as oil tar, benzene, acetone, methyl alcohol, cresylic acid, and heavy fuel oil are to be extracted. It is also stated that the erection of a large treatment plant will be begun upon the arrival of the English company's representative.

MR. S. R. CARTER read a paper on "The Measurement of the Concentration of Hydrogen ion" before the Birmingham and Midland Section of the Society of Chemical Industry on Tuesday. He dealt with the strength of acids and gave a scale of acidity based on the electrolytic solution theory. Knowledge of the concentration of hydrogen ion, he said, was becoming increasingly necessary in view of the large number of reactions in chemistry and bio-chemistry which were dependent upon it. The behaviour of indicators was discussed, and it was pointed out that the use of indicators provided a definite means of measurement of the concentration of hydrogen ion. The electrometric method was also referred to as an alternative method of measurement.

SYNTHETIC NITROGEN PRODUCTION in Germany is reported by Aikman (London), Ltd., to be on much the same scale as last year, and appears likely to reach about 320,000 tons of nitrogen for the year ending May 31 next. In November and December last, it was considerably curtailed by a strike at the Oppau Factory, which has, however, since terminated. Apart from about 10,000 tons of sulphate of ammonia, which was exchanged for Chilean nitrate, nothing was sold for export, and from the inquiries for Chilean nitrate, it is evident that the home production is totally inadequate to meet the requirements in Germany. The scarcity of soda has reduced the production of nitrate of soda in Germany to about 12 per cent. of the total, the remaining 88 per cent. being divided between sulphate of ammonia and cyanamide.

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DRUGS.—Some new hypnotics of the carbituric acid series. H. A. Shoule and A. Moment. *J. Amer. Chem. Soc.*, January, 1923, pp. 243–249.

OILS.—New qualitative tests for rape and tung oils. A. W. Thomas and C. L. Yu. *J. Amer. Chem. Soc.*, January, 1923, pp. 129–130.

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AMMONIUM SULPHATE.—Manufacture of ammonium sulphate in gas works. A. Grebel. *Chim. et Ind.*, January, 1923, pp. 26–42.

ANTHRAQUINONE.—The chemistry of anthraquinone. Part IV. E. Grandmougin. *Chim. et Ind.*, January, 1913, pp. 46–52.

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ANALYSIS.—A new crucible for the quick determination of sulphur. H. Hiller. *Z. angew. Chem.*, January 13, 1923, pp. 25–26.

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FERMENTATION.—The chemistry of fermentation phenomena. C. Neuberg. *Ber.*, December 9, 1922, pp. 3624-3638.

THIOPHENE.—The constitition of thiophene. W. Steinkopf. *Annalen*, December 12, 1922, pp. 78–112.

ORGANO-METALLIC COMPOUNDS.—Ring compounds containing mercury and attempts to prepare mixed thiophene—mercury compounds. W. Steinkopf, W. Bielenberg and H. A. Jensen. *Annalen*, December 12, 1922, pp. 41–78.

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PER SALTS.—Bismuth and antimony perchlorates. F. Fichter and E. Jenny. *Helv. Chim. Acta*, February 1, 1923, pp. 225–231.

REACTIONS.—The condensation products of phenylhydroxylamine with oxymethylene compounds and carbinols. Part IV. Oxymethylene-phenylacetic ester and oxymethylene-benzylcyanide and phenylhydroxylamine. H. Rupe and J. Grünholz. *Helv. Chim. Acta*, February 1, 1923, pp. 102–110.

Patent Literature

Abstracts of Complete Specifications

191,762. Treating Liquids with Chemical Reagents, Means for. W. Paterson, Windsor House, Kingsway, London, W.C.2. Application date, July 8, 1921.

The apparatus is more particularly for adding a definite proportion of a chemical reagent for the purpose of softening or purifying water. The water supply is passed through a Venturi tube, and the pressure difference set up is employed to control the flow of a separate small quantity of water to a reciprocating or oscillating meter. The movement of the meter actuates a valve which controls the supply of pressure liquid to a hydraulic cylinder. The movements of the piston of this cylinder control the supply of liquid or powdered reagent to the water main. The proportion of reagent supplied may be varied by varying the stroke of the hydraulic piston.

191,765. Fixing Nitrogen, Process For. K. P. McElroy, 711, G. Street, N.W., Washington, D.C., U.S.A. Application date, July 14, 1921.

The process is of the kind in which alkali and carbon are heated in a current of nitrogen, air or producer gas, to fix the nitrogen as cyanide. The materials are fed to a reaction chamber containing liquid and gaseous cyanide, and part of the reaction gases is withdrawn to preheat the raw materials; a further part of the gases is withdrawn through a side chamber containing adsorptive carbon which is heated to prevent the reversion of the cyanide. The rate of withdrawal of the cyanide is such as to maintain the quantity of cyanide in the reaction chamber. The process is carried out in a blast furnace or slagging gas-producer at a temperature of 1,200°–1,400° C. The cyanide vapour produced comes into contact with the carbon and alkali in the presence of nitrogen, so that its latent heat is available for supplying the heat for further cyanide formation in the liquid phase. The cyanide is an active reducing agent, and its presence accelerates the production of further quantities of cyanide. It is found that at a temperature of 1,000° C., charcoal is capable of adsorbing more than its own weight of cyanide from producer gas carrying cyanide vapour, and this property is used for recovering the cyanide at a temperature which prevents cyanide reversion. The heat liberated during the adsorption of the cyanide can be used for producing a further quantity of cyanide, if the charcoal contains the necessary alkali. The shaft furnace used is provided with a gas outlet near the fusion zone, for drawing off the cyanide vapour into contact with the charcoal. The raw materials are charged into the top of the furnace, and air is blown in at the bottom at 800°–1,000° C., the descending materials being preheated by the ascending gases. The concentration of cyanide vapour in the gas may reach 15–20 per cent. The alkali is preferably added in the form of carbonate, but sulphates, chlorides, silicates or aluminates may be used. The cyanide may be treated with steam to produce ammonia and formate, carbonate, or oxalate, which may be used again in the process.

191,792. Mordant Dyestuffs, Manufacture of. Akt.-Ges. für Anilin-Fabrikation, Berlin-Treptow, Germany, and W. Lange, 10, Feurigstrasse, Berlin-Friedenau, Germany. Application date, October 10, 1921. Addition to 16,592/1915.

Specification No. 15,592/1915 describes the combination of diazotised picramic acid with a 4-acidyl-aminophenol or a substitution product having a free 2-position to produce mordant dyestuffs. In this invention the 4-acidyl-aminophenol is replaced by a derivative of 2- or 3-acidyl-aminophenol which is substitued in the 4-position, but has a free 2- or 6-position. The chrome lakes of these dyestuffs have properties similar to those of the original patent.

191,797. Substituted Alpha-Naphthylamines, Manufacture of a Series of, and of the Dyestuffs Derived from Them. L. B. Holliday and Co., Ltd., Huddersfield, and G. T. Morgan, The University, Edgbaston, Birmingham. Application date, October 12, 1921.

5-nitro-β-naphthylamine is first prepared by treating β-naphthylamine nitrate with concentrated sulphuric acid at a temperature below -5° C. The acid is diluted with 8 volumes of water, heated to boiling point and filtered. The sulphates of 5- and 8-nitro-β-naphthylamines may then be crystallised from the solution. The sulphate of the 5-nitro base is fractionally crystallised, and the base is crystallised from alcohol. The base is then converted into *p*-toluene-1-azo-5-nitro-naphthylamine. This ortho-azo compound is then oxidised to the corresponding 5-nitro-1-2-naphtho-*p*-tolyltriazole, wihch may be reduced to a 5-amino-1 : 2-naphtho-*p*-tolyltriazole. Detailed examples are given of the production of *p*-toluene-1-azo-5-nitro-β-naphthylamine, its oxidation by means of chromium trioxide to 5-nitro-1 : 2-naphtho-*p*-tolyltriazole, and the reduction of the nitrotriazole by means of stannous chloride to 5-amino-1 : 2-naphtho-*p*-tolyltriazole. The hydrochloride of this triazole may be converted into 1 : 2-naphtho-p-tolyltriazole-azo-naphthol by treatment with sodium nitrite to obtain a yellow insoluble diazo compound, and the latter with β-naphthol to obtain the above azo compound.

191,812. Drying or Evaporating Surfaces for Drying Moist Material. N. Testrup, 47, Victoria Street, London, S.W.1, T. Boberg, and Techno-Chemical Laboratories, Ltd., Fairlawn, Clarence Road, Clapham Park, London, S.W.4. Application dates, October 15, 1921, and April 24, 1922.

The apparatus is for facilitating the drying of macerated peat, lignite and like materials by spreading them on the surface of a drum which is internally heated by compressing the evolved vapour to raise its temperature, and then passing it through the drum. Two drums *b*, b^1 are used, having circumferential grooves on their cylindrical surfaces. The drums are provided with hollow trunnions carried by bearings *c*, *d*, one of which, *c*, is adjustable horizontally to adjust the distance between the peripheries of the drums while the other *d*, is adjustable in an axial direction to adjust the relationship of the grooves to one another. The drums are driven

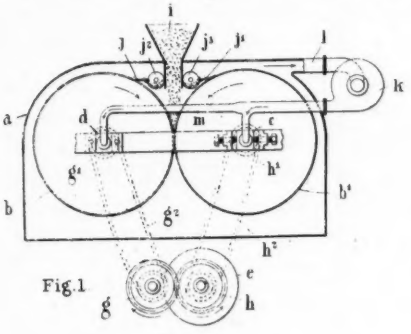


Fig.1.

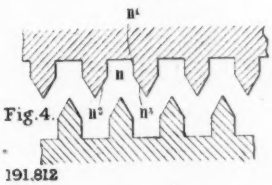


Fig.4.

191.812

positively in opposite directions by inter-engaging toothed pinions, chain wheels *g*, *h*, g^1, h^1, and chains g^2, h^2. The material is fed from a hopper *i* between the two drums, and is removed after drying, by scrapers *j*, j^1, and transferred to conveyors j^2, j^3. The steam is first admitted through the hollow bearings *c*, *d*, and the vapour evolved is drawn off through a pipe *l* to a compressor *k*, and returned at a higher temperature through the pipe *m* to the drums. The external supply of steam eventually becomes unnecessary. The circumferential grooves, which are shown enlarged, are about 1/10 in. in width and of slightly less depth. The lower parts of the grooves *n*, n^1, are parallel, and the upper portions n^2, n^3, are bevelled at about 60°. It is found that such grooves are

particularly suitable for retaining the material in good heat-transmitting contact with the drum when the material is moist. The best results are obtained when the ridges on one drum are opposite the recesses on the other, and the material divides itself equally between the two drums. In a modification, a single grooved drum may be used in conjunction with a plain feed roller, or a flat vertical plate may be inserted between the two drums. In another case, the grooves may be parallel to the axis of the drum. The apparatus is capable of dealing with material of a friable nature which would not adhere to plain drums, and also with liquid material, in which case the drum retains about 1·5 to 2·5 times as much liquid as a plain drum.

191,854. DYESTUFFS OF THE TRIARYLMETHANE SERIES, MANUFACTURE OF. O. Y. Imray, London. From Soc. of Chemical Industry in Basle, Switzerland. Application date, October 25, 1921.

These dyestuffs are produced by treating phenyl-chloroform or a substitution derivative or homologue or 1-chloro-2-naphthyl-chloroform, with α-naphthol or a substitution product having a free 4-position, in the presence of an oxide, hydroxide or carbonate of an alkali metal or an alkaline earth metal or magnesium. The reaction is facilitated by the presence of copper or alcohol as a catalyst. The dyestuffs give greenish-blue solutions in caustic alkali, and brown to dark blue solutions in strong sulphuric acid. In an example, 1-naphthol-2-carboxylic acid is dissolved in caustic soda lye and mixed with phenyl-chloroform and a small proportion of alcohol and copper powder. The dyestuff is precipitated by adding salt. The dyestuff gives green tints on wool with chromium mordants. The phenyl-chloroform may be replaced by the chloro-phenyl chloroforms or 1 chloro-2-naphthyl-chloroform, and the 1-naphthol-2-carboxylic acid may be replaced by sulpho-derivatives such as 1-naphthol-7 sulpho-2-carboxylic acid, to obtain sulphonated dyestuffs.

191,764. IRON, PROCESS FOR THE MANUFACTURE OF. R. Franchot and K. P. McElroy, 711, G. Street, N.W., Washington, D.C., U.S.A. Application date, July 14, 1921.

This process is of the kind in which part of the hot reducing gases is diverted from the blast furnace at a level below the usual top outlet, cooled and in part returned to the furnace at a higher zone. In this invention the volume of the reducing gas diverted is adjusted in relation to a volume of gas passing through the shaft so that a substantial amount of carbon is deposited within the shaft. This adjustment is such that the ratio of carbon monoxide to carbon dioxide in the gases discharged at the top is not greater than 60 to 40 by volume, and the temperature of these two gases is below 250° C. It is found that the temperature of the air blast supplied to the furnace to produce the reducing gases may be gradually lowered. A considerable concentration of alkali cyanide vapour usually occurs in the lower part of the furnace, and these vapours are withdrawn with the hot gases and any accumulation in the furnace is prevented. The volume of gas diverted from the hot zone of the furnace is increased to lower the temperature and raise the proportion of carbon dioxide in the top gases, and *vice versa*.

191,886. CONVERSION OF SULPHATE OF LEAD WATER PASTE INTO OIL PASTE, PROCESS FOR. D. Whyte, 214, Whitaker Street, Gisborne, New Zealand. Application date, November 11, 1921.

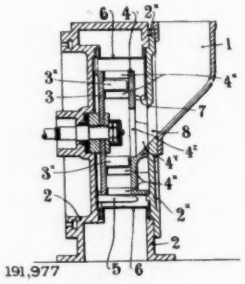
Lead sulphate in the form of a wet precipitate is treated in a hydro-extractor, drying chamber or the like, to remove all free water and convert it into a powder. The lead sulphate is then treated in an agitator or mixer with sufficient oil to form the oil paste. The crystalline structure of the lead sulphate is thus destroyed and the water of crystallisation is liberated in the form of globules which may then be removed from the mixture. The proportion of oil employed is about 9 per cent. by weight.

191,972. CHROMIUM COMPOUNDS OF AZO-DYESTUFFS, MANUFACTURE OF. Society of Chemical Industry in Basle, Switzerland, F. Straub, 587, Grenzacherstrasse, Basle, Switzerland, and R. Sallmann, 23, Rothbergerstrasse, Basle, Switzerland. Application date, February 8, 1922. Addition to 104,045 and 186,635.

Specifications Nos. 104,045 and 186,635 (see THE CHEMICAL AGE, Vol. VII, p. 682) describe the treatment of azo-dyestuffs with an alkali chromite or with the complex compounds obtained by the interaction of chromium hydroxide, an organic derivative containing more than one hydroxyl group and an alkali, to produce the corresponding chromium compounds of the azo dyestuffs. It is now found that these chromium compounds may be produced in a single operation by preparing the dyestuff in the presence of one of the chromium compounds mentioned, and then heating the mixture. In an example, a mixture of caustic soda solution and chromium hydroxide is heated to 60°–70° C., and β-naphthol is then added and the mixture cooled to 15° C. The diazo compound of 1-amino-2-oxynaphthalene-4-sulphonic acid is then added, and the mixture then heated to 40° C. and then to 70°–75° C. The resulting chromium compound is diluted with water, the caustic alkali is neutralised with mineral acid, and the dyestuff precipitated by adding salt. Another example is given in which the starting material is 3-amino-4-cresol-6-sulphonic acid and β-naphthol, and in another case, 1-phenyl-3-methyl-5-pyrazolone and 1-amino-2-oxynaphthalene-4-sulphonic acid.

191,977. DISINTEGRATORS. G. Porteus, Leeds Bridge Works, Hunslet Lane, Leeds. Application date, February 27, 1922.

Material to be disintegrated is supplied from a hopper 1 to a casing 2 containing a fixed ring 4 with studs 4^x, and a rotary disc 3 with studs 3^x which rotate between the fixed studs 4^x. The casing is made of a width sufficiently great to leave a



space 7 between the disc 4 and the side wall 2^x. The fine material produced is removed by fixed members 5, and passes through the cylindrical screen 6. The coarse material collects in the trough 4^y and is returned through the central opening 4^z for further grinding.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—174,599 (Soc. l'Azote Français), relating to the production of granular cyanamide, see Vol. VI., p. 434 ; 174,379 and 174,380 (Hernadvolgyi Magyar Vasipar Reszveny Tarsasag), relating to concentration of ores, see Vol. VI., p. 433 ; 175,963 (Maschinenfabrik Augsburg-Nurnberg Akt.-Ges), relating to apparatus for dry distillation, see Vol. VI., p. 563 ; 179,151 (Zellstoff fabrik Waldhof), relating to manufacture of fertilizers, see Vol. VII., p. 24.

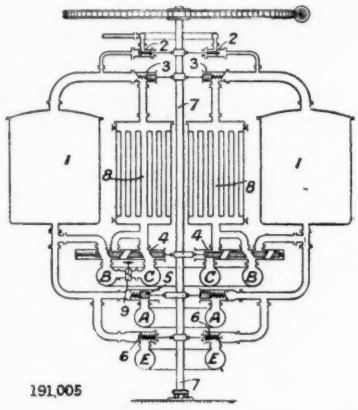
International Specifications not yet Accepted

191,002. BUTYL CHLORIDES. Ricard, Allenet, et Cie., Distilleries des Deux-Sèvres, Melle, Deux-Sèvres, France. International Convention date, December 28, 1921.

Hydrochloric acid is passed continuously through butyl or isobutyl alcohol which contains a dehydrating catalyst such as sodium sulphate, copper sulphate, magnesium chloride, magnesium sulphate, sulphuric acid, phosphoric acid, or sodium bisulphate. Alternatively a catalyst which forms a temporary addition product with hydrochloric acid may be used, such as cuprous or cupric chloride, mercuric chloride, ferrous chloride, or bismuth chloride. Other catalysts which have both functions, such as zinc chloride or cadmium chloride may be used. The mixture is heated to a temperature at which butyl or isobutyl chloride distils off continuously to a condenser, together with water. The water separates as a lower layer. Fresh alcohol is added to replenish that converted into butyl chloride.

191,005. ABSORBING AND RECOVERING GASES. Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. International Convention date, December 30, 1921. Addition to 187,223 (see THE CHEMICAL AGE, Vol. VII., p. 867).

The apparatus is for continuously absorbing gases in charcoal, recovering the gases, and regenerating the charcoal for use again. Gas is supplied from a pipe A through a valve 5 to an absorption vessel 1, the valves 2 and 6 being closed. The treated gas passes out through a valve 3 to a cooler 8 and thence to a collecting pipe B, valve 9, and outlet pipe C. A



central rotating shaft 7 carries cams which open the valves 2, 6 for the inlet and outlet of steam for regenerating the charcoal, and close the other valves Purified gas is also admitted again to the absorption vessels to cool the charcoal. This gas then passes through the valve 3 and cooler 8 to the outlet C. The absorption vessels may be arranged in a circle around the cam shaft 7.

191,008. SYNTHETIC DRUGS. E. Layraud, 25, Boulevard du Temple, Paris. International Convention date, December 31, 1921.

The process is for obtaining unsymmetrical dialkyl-barbituric acids. This is effected by alkylating monoalkyl-barbituric acids, or by condensing urea with unsymmetrical dialkyl-malonic acid esters, chlorides, amides, etc., or unsymmetrical dialkylcyanacetic esters, together with a condensing agent such as sodium ethylate. Salts may also be formed from these acids and alkalies or organic bases, particularly piperazine. Examples are given in which: (1) the silver compound of ethyl-barbituric acid is alkylated with isobutyl-iodide and alcohol, or isoamyl-iodide and alcohol. (2) Urea is condensed with isobutyl-ethyl malonic ester and sodium ethylate to yield ethylbutyl-barbituric acid. (3) Butylpropyl-cyanacetic ester is condensed with urea and sodium ethylate, yielding an imino derivative which is hydrolysed with hydrochloric acid, yielding the corresponding dialkylbarbituric acid. (4) Dialkylbarbituric acids are treated with hydrated piperazine to obtain the corresponding salts.

191,028–9. ORGANO-ARSENIC COMPOUNDS. Etablissements Poulenc Frères, 92, Rue Vieille du Temple, Paris, and C. Oechslin, 25, Rue de Grignon, Thiais, France. International Convention dates, December 29 and 30, 1921.

191,028.—An alkali arsenite is treated with an aliphatic hydrocarbon containing one or more halogen atoms and one or more hydroxyl groups, and then acidified, to produce hydroxylated aliphatic arsinic acids. Examples are given in which sodium arsenite is treated with glycol chlorhydrin or glycerin mono- or di-chlorhydrin.

191,029.—Acetyl arsenite is heated to decomposing point to produce aliphatic arsenic compounds of the formula $(AsCH)_x$. These may be oxidised to produce compounds of the formula $(AsCH_3O_2)_x$. In an example, arsenious acid is heated with acetic anhydride and sodium acetate to 180° C. Carbon dioxide and acetic acid are liberated, and the product is dried *in vacuo* and extracted with soda or hydrochloric acid. The oxidation may be effected by means of oxygenated water.

LATEST NOTIFICATIONS.

192,994. Dyeing of cellulose acetate, artificial silk, films, and the like. Soc. Chimique des Usines du Rhone. February 10, 1922.

193,029. Process for extracting tar from mineral oils. Rialland, A. February 7, 1922.

193,057. Method for reducing metallic oxides. Berlin, D. W. February 11, 1922.

Specifications Accepted, with Date of Application

175,989. Fixation of nitrogen. P. Andreu and R. Paquet. February 23, 1921.

179,150. Regenerating sulphurous acid and waste heat from sulphite cellulose boilers, Method of. Zellstofffabrik Waldhof. April 27, 1921.

186,631. Centrifugal apparatus for the separation of solid particles from fluids. F. L. Smidth and Co. October 3, 1921.

188,344. Starch, Manufacture of. A. Singer. November 5, 1921.

192,426. Reduction of ore and production of gas. J. H. Reid, August 2, 1921.

192,438. New ortho-oxyazo dyestuffs, Manufacture of. A. G. Bloxam. (Akt.-Ges. für Anilin-Fabrikation.) September 27. 1921.

192,500. Disinfectants, process for the manufacture of. J. A. Vielle. November 4, 1921.

192,515. Distillation or carbonisation of carbonaceous materials. H. Nielsen and B. Laing. November 10, 1921.

192,572. Heat treatment of substances, by means of molten metal, Thermal Industrial and Chemical (T.I.C. Research Co., Ltd., and J. S. Morgan. January 4, 1922.

192,676. Centrifugal apparatus for separating solids from liquids. Soc. Générale d'Evaporation Procédés Prache et Bouillon. January 24, 1922. Addition to 190,707.

Applications for Patents

Calvert, G. Treatment of rubber latex. 4650. February 17.

Dutt, E. E., and Godfrey, S. H. Production of white titanium pigments. 4063. February 12.

Dutt, E. E., and Godfrey, S. H. Extraction of radio-active constituents from titaniferous materials. 4064. February 12.

Dutt, E. E., and Godfrey, S. H. Separation of hafnium from titaniferous materials. 4065. February 12.

Fabrwerke vorm. Meister, Lucius, and Brüning. Manufacture of azo dye-stuffs. 4287. February 13. (Germany, February 24, 1922).

Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of emulsions of medicaments soluble in oil. 4513. February 15.

Jaques, A., and West, J. H. Manufacture of ammonium compounds. 4619. February 16.

Mydegger, O. Process of manufacturing sulphate of chrome, 4509. February 15. (Belgium, May 31, 1922.)

Neath, J. Manufacture of coal gas. 4235. February 13.

Ozon-Hochfrequenz Ges. Production of ozone. 4703. February 17. (Germany, February 18, 1922.)

Plauson, H., and Plauson's (Parent Co.), Ltd. Cracking and hydrogenation of oils. 4641. February 17.

Popham, F. J. W. Preparation of mixtures of tar and bitumen etc. 4433. February 15.

Roucka, E. Apparatus for measuring and transmitting expressions of physical or chemical values. 4115. February 12. (Czecho-Slovakia, February 14, 1922.)

Schmidt, L. Process of manufacturing glycerin and alkali soap.. 4129. February 12. (Germany, April 21, 1922.)

Semmens, E. S. Hydrolysis of starch, etc., by artificially-polarised light. 4291. February 14.

A Warning to Chemical Inventors

CAPTAIN G. DRURY COLEMAN, organising secretary of the Institute of Patentees, draws attention to a letter written from Bonn which, he says, is being circulated among British inventors and patentees. Several members of the Institute have received this letter, in which the writer, a German, claims to have anticipated their inventions, though they belong to widely different fields. In each case, however, he admits that the British inventor was first in the field, in spite of which he asks permission to take part of the British invention and in addition to receive a sum of money. The letter is written in very bad English, is full of spelling errors, and in some places is difficult to understand.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

London, February 22, 1923.

BUSINESS has been quite active this week and prices are well maintained.

The position as regards German productions becomes increasingly difficult and we understand that quite a number of German suppliers have suspended delivery meantime.

Export inquiry has been lively and some good contracts have been fixed.

General Chemicals

ACETONE continues very firm and in good request; arrivals come to hand very sparingly.

ACID ACETIC maintains its advance and the material is in good request.

ACID CITRIC is dearer and the price now tends to harden.

ACID FORMIC.—Without change in value and in good request.

ACID LACTIC is in demand, but supplies are slow in coming to hand.

ACID OXALIC.—Unchanged and in fair request.

ARSENIC.—It is almost impossible to buy for near delivery, and good business is reported for forward.

BARIUM CHLORIDE has slightly advanced and the demand is better.

FORMALDEHYDE continues scarce and firm.

LEAD ACETATE has advanced, as was to be expected, and is in good request.

METHYL ALCOHOL is unobtainable on the spot and high prices are paid for forward.

POTASSIUM CARBONATE is lifeless and the demand very small.

POTASSIUM CAUSTIC is neglected, with practically no business passing.

POTASSIUM PERMANGANATE is scarce and firm.

POTASSIUM PRUSSIATE has been in request at full figures.

SODIUM ACETATE is slightly easier, mainly owing to the lack of interest.

SODIUM HYPOSULPHITE.—Without change in value and with moderate demand.

SODIUM NITRITE has been in better request, but price is unchanged.

SODIUM PRUSSIATE still continues on the easy side, the export demand not yet having reaccessed itself.

SODIUM SULPHIDE is in very poor request and price inclined to be easy.

ZINC OXIDE is unchanged.

Pharmaceutical Chemicals

AMIDOPYRIN, owing to small demand is slightly easier on the week.

BARBITONE.—Spot supplies are light and the market is hardening.

GUAIACOL CARBONATE.—More inquiry, with holders now asking higher prices.

HEXAMINE continues to advance, higher figures being readily paid for the best brands.

METOL.—Forced realisation overshadows this market, which is consequently depressed.

MILK SUGAR has been active. Price remains steady with a somewhat easier tendency due to increased imports.

SANTONINE.—Weak, second-hands selling at considerably below official prices.

SALICYLIC ACID.—In sympathy with the carbolic acid market, which has advanced almost daily during the week, higher values are foreshadowed.

SALICYLATE SODA has advanced sharply, leading Continental manufacturers now asking much higher prices, which have been paid.

Coal Tar Intermediates

Business has continued without any particular features to report and a number of transactions have taken place.

ALPHA NAPHTHOL is in fair demand and stocks for prompt delivery continue on the short side.

ALPHA NAPHTHYLAMINE is unchanged.

ANILINE OIL.—Some home business has been done.

ANILINE SALT.—Export inquiries have been received.

BENZIDINE BASE is quiet but a certain amount of home trade is in the Market.

BETA NAPHTHOL is steady at last quoted values.

DIMETHYLANILINE.—The price has arisen following advances in Methyl Alcohol and stocks for immediate delivery are not excessive.

DIPHENYLAMINE.—A rise is shortly expected in this product following the recent firmness in the Phenol Market.

NITRO BENZOL continues steady with the usual home business passing.

PARANITRANILINE is unchanged.

PARA NITRO CHLOR BENZOL.—Some export inquiry has been received.

PARAPHENYLENEDIAMINE continues at last quoted price.

SULPHANILIC ACID has been a fair business and price is unchanged.

XYLIDINE.—Some home inquiries have been received.

Coal Tar Products

The firm tone of the market is well maintained, the demand for many coal tar products exceeding the supply.

90% BENZOL is steady at 1s. 7½d. to 1s. 8d. per gallon on rails in the Midlands.

PURE BENZOL is in poor demand, and is worth 2s. per gallon in the North, and 2s. 4d. to 2s. 6d. per gallon in the South.

CREOSOTE OIL is scarce, and the price maintains its upward tendency. It is worth about 8¼d. to 8¾d. per gallon in the Midlands and North, and about 9d. to 9¼d. per gallon in the South.

CRESYLIC ACID is uninteresting, and is worth about 2s. per gallon on rails for the pale quality 97/99%, and 1s. 9d. per gallon for the dark quality 95/97%.

SOLVENT NAPHTHA is quiet for prompt delivery, and is worth about 1s. 6d. per gallon in the North, and 1s. 10d. to 2s. per gallon. in London.

HEAVY NAPHTHA has a poor inquiry, and is worth about 1s. 6d. per gallon on rails.

NAPHTHALENE is in good demand, the Crude qualities being worth from £6 to £10 per ton, according to quality.

PITCH remains very firm, and prices are still advancing. To-day's quotations are: London, 175s.; East Coast, 170s.; to 172s. 6d.; West Coast, 167s. 6d. to 170s.

Sulphate of Ammonia

There is a steady and satisfactory demand both for home trade and for export.

Current Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	4	to	0	1	6
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	130	0	0	to	135	0	0
Acid, Acetic, glacial, 99–100%	ton	69	0	0	to	70	0	0
Acetic, 80% pure	ton	45	0	0	to	46	0	0
Arsenic, liquid, 2000 s.g.	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	55	0	0	to	60	0	0
Carbolic, cryst. 39–40%	lb.	0	1	5	to	0	1	6
Citric	lb.	0	1	9	to	0	1	10
Formic, 80%	ton	50	0	0	to	51	0	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	41	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	44	0	0
Nitric, 80 Tw.	ton	27	0	0	to	29	0	0
Oxalic	lb.	0	0	7	to	0	0	7½
Phosphoric, 1.5	ton	40	0	0	to	42	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, Technical	lb.	0	1	6	to	0	1	7
Sulphuric, 92–93%	ton	6	10	0	to	7	10	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	2½	to	0	1	3

	Per	£	s.	d.		£	s.	d.
Alum, lump	ton	11	10	0	to	11	15	0
Alum, chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	7	10	0	to	8	0	0
Aluminium, sulphate, 17–18%	ton	9	10	0	to	10	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
Ammonia, .880	ton	32	0	0	to	34	0	0
Ammonia, .920	ton	22	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	4	to	0	0	4½
Ammonia, chloride	ton	50	0	0	to	55	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate (pure)	ton	35	0	0	to	40	0	0
Ammonia, phosphate	ton	65	0	0	to	68	0	0
Ammonia, sulphocyanide, com'l, 90%	lb.	0	1	1	to	0	1	3
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white, powdered	ton	70	0	0	to	75	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Barium carbonate, Precip.	ton	15	0	0	to	16	0	0
Barium, Chlorate	ton	65	0	0	to	70	0	0
Barium Chloride	ton	16	10	0	to	17	0	0
Nitrate	ton	33	0	0.	to	35	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	1
Bleaching powder, 35–37%	ton	10	10	0	to	11	0	0
Borax crystals	ton	28	0	0	to	32	0	0
Calcium acetate, Brown	ton	12	10	0	to	13	10	0
,, ,, Grey	ton	17	10	0	to	18	0	0
Calcium Garbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	0	0	to	7	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	98	0	0	to	105	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	27	10	0	to	28	10	0
Cream Tartar, 98–100%	ton	92	10	0	to	95	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	90	0	0	to	95	0	0
Formusol (Rongalite)	lb.	0	2	2	to	0	2	3
Glauber salts, commercial	ton	5	0	0	to	5	10	0
Glycerin, crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	3	to	0	2	4
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	41	0	0	to	43	0	0
Carbonate (White Lead)	ton	45	0	0	to	48	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	22	10	0	to	23	10	0
Magnesium chloride	ton	5	10	0	to	6	0	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	6	10	0	to	7	0	0
Sulphate (Druggists')	ton	10	0	0	to	11	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	58	0	0	to	60	0	0
Methyl acetone	ton	62	0	0	to	63	0	0
Alcohol, 1% acetone	ton	105	0	0	to	110	0	0
Nickel sulphate, single salt	ton	43	0	0	to	44	0	0
Ammonium sulphate, double salt	ton	43	0	0	to	44	0	0
Potash, Caustic	ton	32	0	0	to	33	0	0
Potassium bichromate	lb.	0	0	5¾	to	0	0	6
Carbonate, 90%	ton	30	0	0	to	31	0	0
Chloride, 80%	ton	9	10	0	to	10	10	0
Chlorate	lb.	0	0	4½	to	0	0	4½
Metabisulphite, 50–52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	43	0	0	to	45	0	0
Permanganate	lb.	0	0	9	to	0	0	9½
Prussiate, red	lb.	0	4	3	to	0	4	6
Prussiate, yellow	lb	0	1	6	to	0	1	6½
Sulphate, 90%	ton	12	10	0	to	13	10	0
Salammoniac, firsts	cwt.	3	3	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	24	10	0	to	24	15	0
Arseniate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to	0	0	4½
Bisulphite 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	3½	to	0	0	3½
Caustic, 70%	ton	19	10	0	to	20	0	0
Caustic, 76%	ton	20	10	0	to	21	0	0
Hydrosulphite, powder	lb.	0	1	6	to	0	1	7
Hyposulphite, commercial	ton	10	10	0	to	11	0	0
Nitrite, 96–98%	ton	28	0	0	to	29	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Sodium perborate	lb.	0	0	10	to	0	0	10½
Prussiate	lb.	0	0	10½	to	0	0	11
Sulphide, crystals	ton	10	10	0	to	11	0	0
Sulphide, solid, 60–62%	ton	16	10	0	to	17	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	55	0	0	to	60	0	0
Strontium Nitrate	ton	40	0	0	to	42	0	0
Strontium Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	11	10	0	to	12	10	0
Roll	ton	11	0	0	to	12	0	0
Tartar emetic	lb.	0	1	3	to	0	1	4
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	4	to	0	1	5
Zinc chloride 102° Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	40	0	0	to	42	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	16	10	0	to	17	10	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	2	10	to	0	3	0
Acetanilid	lb.	0	1	4	to	0	1	6
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	9	to	0	3	0
Salicylic, B.P.	lb.	0	1	7½	to	0	1	10½
Tannic, leviss	lb.	0	3	4	to	0	3	6
Amidol	lb.	0	8	6	to	0	8	9
Amidopyrin	lb.	0	13	3	to	0	13	9
Ammon ichthosulphonate	lb.	0	2	0	to	0	2	3
Barbitone	lb.	0	13	0	to	0	14	0
Beta naphthol resublimed	lb.	0	1	9	to	0	2	0
Bromide of ammonia	lb.	0	0	7½	to	0	0	8
Potash	lb.	0	0	6½	to	0	0	7
Soda	lb.	0	0	7	to	0	0	7½
Caffeine, pure	lb.	0	12	0	to	0	12	3
Calcium glycerophosphate	lb.	0	5	6	to	0	6	0
Calcium lactate	lb.	0	2	0	to	0	2	3
Calomel	lb.	0	4	9	to	0	5	0
Chloral hydrate	lb.	0	4	3	to	0	4	6
Cocaine alkaloid	oz.	0	18	6	to	0	19	0
Cocain hydrochloride	oz.	0	15	0	to	0	15	6
Corrosive sublimate	lb.	0	4	3	to	0	4	6
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	1	7	to	0	1	7½
B.P. (75–80% eucalyptol)	lb.	0	1	8	to	0	1	8½
Guaiacol carbonate	lb.	0	8	3	to	0	8	6
Liquid	lb.	0	9	0	to	0	9	6
Pure crystals	lb.	0	10	0	to	0	10	6
Hexamine	lb.	0	4	0	to	0	4	3
Hydroquinone	lb.	0	3	0	to	0	3	3
Lanoline anhydrous	lb.	0	0	7½	to	0	0	8
Lecithin ex ovo	lb.	0	18	6	to	1	0	0
Lithia carbonate	lb.	0	9	6	to	0	10	0
Methyl salicylate	lb.	0	2	2	to	0	2	6
Metol	lb.	0	9	6	to	0	10	0
Milk sugar	cwt.	4	15	0	to	5	0	0
Paraldehyde	lb.	0	1	5	to	0	1	6
Phenacetin	lb.	0	5	0	to	0	5	3
Phenazone	lb.	0	6	6	to	0	6	9
Phenolphthalein	lb.	0	5	0	to	0	5	3
Potassium sulpho guaiacolate	lb.	0	5	0	to	0	5	3
Quinine sulphate, B.P.	oz.	0	2	3			—	
Resorcine, medicinal	lb.	0	5	3	to	0	5	6
Salicylate of soda powder	lb.	0	2	3	to	0	2	6
Crystals	lb.	0	2	4	to	0	2	7
Salol	lb.	0	2	3	to	0	2	6
Soda Benzoate	lb.	0	2	0	to	0	2	3
Sulphonal	lb.	0	13	6	to	0	14	0
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	6
,, soda salicylate	lb.	0	8	0	to	0	8	6
Vanillin	lb.	1	2	6	to	1	3	6

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	2	0	to	0	2	3
Alphanaphthol, refined	lb.	0	2	6	to	0	2	9
Alphanaphthylamine	lb.	0	1	6	to	0	1	7
Aniline oil, drums extra	lb.	0	0	9½	to	0	0	10
Aniline salts	lb.	0	0	9½	to	0	0	10
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	0	to	0	3	3
Benzidine, base	lb.	0	5	0	to	0	5	3
Benzidine, sulphate	lb.	0	3	9	to	0	4	0
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3

	Per	£	s.	d.		£	s.	d.
Betanaphthol	lb.	0	1	2½	to	0	1	3
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Croceine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	4	to	0	1	5
Dinitrophenol	lb.	0	1	7	to	0	1	9
Dimethylaniline	lb.	0	2	6	to	0	2	9
Diphenylamine	lb.	0	3	9	to	0	4	0
H-Acid	lb.	0	5	0	to	0	5	3
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	2	3	to	0	2	6
Naphthionate of Soda	lb.	0	2	6	to	0	2	9
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitrobenzol	lb.	0	0	8	to	0	0	8
Nitronaphthalene	lb.	0	1	0	to	0	1	1½
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol, base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Para-amidophenol, hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	0	to	0	3	3
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	11	6	to	0	11	9
Paratoluidine	lb.	0	5	9	to	0	6	3
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin, technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	10	to	0	0	11
Tolidine, base	lb.	0	7	3	to	0	7	9
Tolidine, mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

Both the Essential Oil and Synthetics markets have been extremely quiet and there is very little business passing.

Essential Oils.		£	s.	d.
Anise	c.i.f. 1/10 spot	0	2	0
Bay		0	11	0
Bergamot		0	12	0
Cajuput		0	3	9
Camphor, white	per cwt.	4	2	6
Camphor, brown	per cwt.	3	15	0
Cassia	c.i.f. 7/3 spot	0	8	3
Cedarwood		0	1	6
Citronella (Ceylon)		0	3	3
Citronella (Java)		0	3	6
Clove		0	7	0
Eucalyptus		0	1	6
Geranium Bourbon	firmer	1	6	0
Lavender	weak	0	11	0
Lavender spike		0	3	3
Lemon		0	2	11
Lemongrass	firmer, per oz.	0	0	2½
Lime (distilled)		0	3	0
Orange sweet (Sicilian)		0	9	0
Orange sweet (West Indian)		0	8	6
Palmarosa		0	17	6
Peppermint (American)	easier	0	13	6
Mint (dementholised Japanese)		0	7	0
Patchouli		1	12	0
Otto of Rose	per oz.	1	4	0
Rosemary		0	1	8
Sandalwood		1	6	0
Sassafras		0	5	0
Thyme	according to quality 2/4 to	0	6	0
Synthetics.				
Benzyl acetate		0	3	0
Benzyl benzoate		0	3	0
Citral		0	10	6
Coumarine		0	12	0
Heliotropine		0	5	6
Ionone		1	7	0
Linalyl acetate		1	2	6
Methyl salicylate	firm	0	2	3
Musk xylol		0	8	6
Terpeniol		0	3	0

The Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, February 22, 1923.

The general position of the chemical market here is about maintained at the degree of activity witnessed during the last two or three weeks. Homes buyers have been fairly active purchasers of the staple products, but parcels, on the whole, have been comparatively small. Overseas business is also at about the recent level. Trade on Continental account has been confined to very small shipments, with the possible exception of pitch, the bulk of the export demand, as before, coming from the Dominions.

Heavy Chemicals

Caustic soda is still in fairly active inquiry for home consumers and also for shipment, prices ranging from £19 per ton, 60–68 per cent., to £21 10s. for 76–77 per cent. strength. Bleaching powder is firm at £11 10s. per ton, and also meets with a steady demand for home and export. Soda crystals are steady at £5 10s. per ton, delivered, but the demand is only moderate. Home users appear to be taking little interest in saltcake, though business on foreign account keeps fairly good; prices are unchanged at £4 10s. per ton for home consumption and about 20s. more for export. Sodium sulphide, 60–65 per cent. concentrated, is steady at £16 per ton, with crystals quoted at about £10. Glauber salts are rather quiet but firm at £4 10s. per ton. Bicarbonate of soda is being called for in moderate quantities at £10 10s. per ton, delivered to home users. Alkali keeps steady at £7 12s. 6d. per ton for 58 per cent. material, both home and foreign business being maintained. Hyposulphite of soda is still quiet, and a little easier at £15 10s. per ton for photographic crystals and £10 for commercial. Nitrite of soda is quoted at £28 per ton, but the demand is quiet. Phosphate of soda is also quiet and easier at £15 10s. per ton. Chlorate of soda is firm at about 3d. per lb., holders meeting with a steady inquiry. Prussiate of soda is firm at 9¾d. per lb., spot supplies being on the short side. Bichromate of soda is steady and in good demand at 4½d. per lb. Acetate of soda is in rather good inquiry at £23 10s. per ton.

Caustic potash is now quoted at about £30 per ton for 88-90 per cent. strength, available supplies being readily taken up. Carbonate of potash is steady at £25 10s. per ton for 90 per cent material, though the demand is said to be somewhat quieter. Bichromate of potash is selling fairly satisfactorily at 6d. per lb. Bigger supplies of yellow prussiate of potash are reported, but the price is firm at 1s. 5½d. per lb. Chlorate of potash is steady at 3¾d. per lb. on a continued good demand. Permanganate of potash is unchanged and in steady inquiry at 8d. per lb.

Sulphate of copper is firm at £26 10s. per ton, with a fair inquiry from home and foreign buyers. Arsenic is in short supply, and with a steady export demand, prices are well held at £75 per ton for white powdered, Cornish makes. Commercial Epsom salts are fairly active at about £5 5s. per ton, with magnesium sulphate, B.P., on offer at £7 15s. Grey acetate of lime is again firmer on continued scarcity at about £20 per ton, with brown also higher at £10. Nitrate of lead is quiet but steady at £41 10s. per ton. White sugar of lead is still rather active at £40 per ton, brown being scarce at £39.

Acids and Tar Products

Tartaric acid is a shade easier at 1s. 2d. per lb, though a fairly good demand is being met with. Citric acid, B.P. crystals, is also slightly lower at about 1s. 8d. per lb. for prompt delivery. Acetic acid prices are not quite so firm, £66 now being quoted for glacial, and £43 per ton for 80 per cent. technical, improved supplies being on offer. Oxalic acid is still quiet at 6¾d. per lb.

The Manchester f.o.b. quotation for pitch is firmly maintained at £7 10s. per ton, the export inquiry for spot parcels still being strong. Carbolic crystals have made a big jump since my last report, 1s. 2d. per lb. being mentioned; crude 60 per cent. material has advanced to 3s. 3d. per gal., though there is not much to be got hold of. Benzole is quiet and unchanged at 1s. 8d. per gal. Solvent naptha is also an inactive section at 1s. 9d. per gal. The demand for creosote oil keeps up, and about 9d. per gal. is now quoted. Naphthalenes are quiet but steady at £16 10s. per ton for refined, and up to £9 per ton for crude.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, February 21, 1923.

BUSINESS continues quiet, and there is little of importance to record.

Quotations for Continental materials on spot are inclined to be higher, but offers for forward delivery are still numerous and on about the same level as last week.

Industrial Chemicals

ACID ACETIC.—Glacial 98/100%, £59 to £63 per ton; 80% pure, £43 to £45 per ton; 80% tech., £42 to £44 per ton, c.i.f. U.K. ports.

ACID BORACIC.—Crystal or granulated, £55 per ton; powdered, £57 per ton, carriages paid U.K. stations.

ACID CITRIC.—B.P. crystals about 1s. 7d. per lb., spot, 1s. 6d. per lb., forward delivery.

ACID FORMIC, 80%.—Quoted £56 per ton, ex wharf.

ACID HYDROCHLORIC.—Price unchanged, 6s. 6d. per carboy, ex works.

ACID NITRIC, 84°.—£27 10s. per ton, ex station, full truck loads.

ACID OXALIC.—Offered at 6¾d. per lb., ex store.

ACID SULPHURIC.—144°, £3 15s. per ton; 168°, £7 per ton, ex works, full loads; de-arsenicated quality, £1 per ton extra.

ACID TARTARIC.—Quoted 1s. 2d. per lb. ex store.

ALUM, LUMP POTASH.—Spot material about £12 per ton. Offered from Continent at £10 2s. 6d. per ton, c.i.f. U.K.

ALUMINA SULPHATE.—14/15%, £7 per ton; 17/18%, £9 5s. per ton, c.i.f. U.K., prompt shipment.

AMMONIA, ANHYDROUS.—Unchanged at 1s. 6d. per lb. ex station.

AMMONIA CARBONATE.—Lump, 4d. per lb.; ground, 4¼d. per lb. delivered.

AMMONIA, LIQUID.—880°, 3d. per lb.; 920°, 1¾d. per lb. ex works.

AMMONIA, MURIATE.—Grey galvanisers quality, £30 to £31 per ton f.o.r. works.

AMMONIA SALAMMONIAC.—Fine white crystals, £25 per ton, ex wharf.

AMMONIA SULPHATE.—25¼%, £15 5s. per ton; 25¾% neutral, £16 8s. per ton, ex works, February delivery.

ARSENIC, WHITE POWDERED.—Price maintained at £74 per ton, ex wharf. Moderate export inquiry.

BARIUM CHLORIDE.—98/100%.—Quoted £16 10s. per ton, c.i.f. U.K. prompt shipment.

BARYTES.—Fine white english unchanged at £5 5s. per ton, ex works. Continental about £4 15s., c.i.f. U.K.

BLEACHING POWDER.—£11 10s. per ton, ex station for spot lots; contracts, £1 per ton less.

BORAX.—Crystal or granulated, £28 per ton; powdered, £29 per ton, carriage paid U.K. stations. Offered from America at £25 per ton, c i.f. U.K.

CALCIUM CHLORIDE.—English material, £5 15s. per ton, ex quay or station. Continental, about £4 per ton, c.i.f. U.K.

COPPER SULPHATE.—Price about £25 10s. per ton, ex store.

COPPERAS GREEN.—Offered at £2 10s. per ton, f.o.b. U.K.

FORMALDEHYDE, 40%.—Spot lots about £90 per ton, ex wharf. Slightly less for forward delivery.

GLAUBER SALTS.—Price for spot lots, £4 per ton, ex store. Offered at £2 18s. 6d. per ton, c.i.f. U.K.

LEAD, RED.—English makers have advanced price by 20s. per ton. Now £42 per ton, carriage paid U.K. stations in 5 ton lots. Continental material quoted £34 10s. per ton, c.i.f. U.K.

LEAD, WHITE.—English material, £53 5s. per ton, carriage paid U.K. stations, 5 ton lots. Continental white lead, £36 per ton, c.i.f. U.K.

LEAD ACETATE.—Fine white crystals, about £38 10s. per ton, c.i.f. U.K. ports, prompt.

MAGNESITE, GROUND CALCINED.—£8 10s. per ton, ex store or station.

MAGNESIUM CHLORIDE.—Offered at £2 11s. per ton, c.i.f. U.K. Spot lots, £3 10s. per ton, ex store.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial, £6 per ton; B.P. quality, £6 10s. per ton, f.o.b. U.K.

POTASSIUM BICHROMATE.—Makers advise reduction of ¼d. per lb.; now 5¾d. per lb. delivered.

POTASSIUM CARBONATE, 90/92 per cent.—Offered from Continent at £26 per ton, c.i.f., spot lots; about £27 per ton, ex store.

POTASSIUM CAUSTIC, 88/92%.—Quoted £28 15s. per ton, c.i.f. U.K.; spot lots about £30 per ton.

POTASSIUM CHLORATE.—Continental material, 3d. per lb., ex store.

POTASSIUM PERMANGANATE.—B.P. quality about 9d. per lb., ex store.

POTASSIUM PRUSSIATE (Yellow).—Unchanged at 1s. 5½d. per lb.

POTASSIUM SULPHATE, 90/92%.—Quoted £13 per ton, basis 90%, ex wharf.

POTASSIUM NITRATE (Saltpetre).—Offered at £23 per ton, c.i.f. U.K.

SODIUM ACETATE.—About £23 10s. per ton, early delivery.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station; m.w. quality, £1 10s. per ton less.

SODIUM BICHROMATE.—Unchanged at 4½d. per lb. delivered.

SODIUM CARBONATE.—Soda crystals, £5 5s. per ton, ex quay or station; alkali 58%, £8 17s. 6d. per ton, ex quay or station.

SODIUM CAUSTIC.—76/77%, £21 10s. per ton; 70/72%, £20 per ton; 60/62%, broken, £21 5s. per ton; 98/99%, powdered, £24 17s. 6d. per ton, ex station.

SODIUM CHLORATE.—Offered at 2½d. per lb., ex store.

SODIUM HYPOSULPHITE.—Commercial, £10 per ton; pea crystals, about £15 10s. per ton, ex station.

SODIUM NITRATE 96/98%.—Refined quality, quoted £13 2s. 6d. per ton, f.o.b. U.K.

SODIUM PRUSSIATE (Yellow).—Price about 9¼d. per lb., ex store. Little demand.

SODIUM SULPHATE (Saltcake, 95%).—Price to home consumers, £4 per ton, on contract. Price for export higher.

SODIUM SULPHIDE, 60/62% conc.—Offered at £13 per ton c.i.f. U.K. Spot lots about £15 per ton, ex store.

SULPHUR.—Government surplus stocks of Sicilian thirds still available, £3 10s. to £3 15s. per ton, ex depot. Flowers, £10 per ton; roll, £9 per ton; rock, £8 per ton; ground, £8 per ton, ex store or quay.

TIN CRYSTALS.—Unchanged at 1s. 2d. per lb.

ZINC CHLORIDE, 98/100%.—About £23 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—Good home inquiry. Price, 1s. 6½d. per lb., delivered, casks included.

BENZYL SULPHANILATE OF SODA.—Small inquiry. Price, 4s. 6d. per lb., carriage paid, casks free.

BETA NAPHTHYLAMINE.—Fair inquiry for export. Price quoted, 4s. per lb., f.o.b. U.K. port.

DICHLORBENZENE.—Small inquiry. Price, £55 to £60 per ton, f.o.b. U.K. port, drums included.

DI-ETHYL-ANILINE.—Small inquiry. Price quoted, 4s. 7d. per lb., carriage paid, drums extra, returnable.

DIMETHYLANILINE.—Good demand. Price now 2s. 11d. to 3s. per lb., delivered, drums returnable.

DINITROCHLORBENZOL.—Some inquiry. Price quoted, £95 per ton, f.o.b., drums free.

DIPHENYLAMINE.—Moderate inquiry. Price quoted, 4s. per lb., delivered, casks included.

"G" ACID.—Home inquiry. Price quoted, 3s. 3d. per lb., 100% basis, delivered, casks included.

"H" ACID.—Fair inquiry. Price, 5s. 3d. per lb., 100% basis, delivered, casks included.

METANITRANILINE.—Home inquiry. Price, 5s. 6d. per lb., delivered, packages free.

NITRONAPHTHALENE.—Some inquiry. Price, 1s. per lb., delivered, casks included.

PARADICHLORBENZENE.—Good inquiry for export. Price quoted, £50 per ton, f.o.b. U.K. port, packages free.

PARANITRANILINE.—Good inquiry. Price quoted, 2s. 7d. per lb., delivered, casks included.

Company News

HARRISON, BARBER AND CO., LTD.—The accounts for 1922 show a profit of £8,035. A dividend of 6 per cent. is to be paid, against 2½ per cent. for 1921.

JOSEPH CROSFIELD AND SONS.—The accounts for the year to November 30 last show an available balance of £330,937, against £280,566 for the previous year. After payment of preference dividends and 10 per cent. on the ordinary shares, against 5 per cent for the previous year, there is carried forward £3,437, against the £3,056 brought in.

BRITISH ALIZARINE CO., LTD.—A net profit of £25,046 is shown in the accounts for the year 1922, and £31,505 was brought in, making £56,551. The sum of £100,000 has been transferred from reserve in reduction of capital expenditure on land, buildings, and plant. The directors have written off a further £20,000 for depreciation, and recommend the carrying forward of the balance of £36,551. The annual meeting will be held at Oxford Street, Manchester, on February 26 at 3 p.m.

MATHER AND PLATT, LTD.—The net profit for 1922, after charging depreciation, directors' renumeration, and providing for doubtful debts, was £365,535; less transfer to income tax equalisation account, £53,694—£311,841; brought in, £287,661; total, £599,502. After paying the preference dividend the directors recommend a further dividend on the ordinary shares of 7 per cent., making 10 per cent. for the year, plus a bonus of 5 per cent., both free of tax, payable on March 1; to reserve, £200,000; forward, £174,953. The annual meeting will be held in the Chartered Accountants' Library, 60, Spring Gardens, Manchester, on February 27, at 3 p.m.

BRADFORD DYERS' ASSOCIATION, LTD.—The accounts for the two years to December 31 last show that the net profit, after allowing for various contingencies, amounted to £1,800,209, to which has to be added £400,369 brought in, making £2,200,578. A disposable balance of £1,600,079 remains after all necessary deductions have been made. Out of this sum have been paid dividends on the preference shares for the two years to December 31 last, amounting to £250,000, and on the ordinary shares for the year to December 3, 1921, at the rate of 2s. per share, and for the half year to June 30, 1922, at the rate of 1s. per share, amounting to £203,471. The annual meeting will be held on February 28, and the dividend on the ordinary shares will be paid on March 7.

INTERNATIONAL PAINT AND COMPOSITIONS CO., LTD.—After writing off bad debts the profit for 1922 is £37,463, from which have to be deducted depreciation, taxes, etc., leaving £27,118; £3,580 was brought in, making an available total of £30,698. The directors recommend the placing of £3,500 to reserve for bad debts, and after paying the preference dividend, recommend a dividend of 3 per cent. on the ordinary shares for the year, leaving £3,798 to be carried forward. Warrants will be posted on February 28. The undertaking of the Standard Antifouling Composition and Paint Co., Ltd., acquired by the company in April last, has contributed to the increased output and turnover of the company. The annual meeting will be held at Winchester House, London, on February 28, at noon.

BORAX CONSOLIDATED, LTD.—Presiding at the annual meeting on February 18, the Earl of Chichester said the net profits for the past year amounted to £417,900, and it was proposed to allocate £25,000 to general reserve fund, £25,000 to reserve for income tax, and £5,000 to pensions and grants fund, and to pay a final dividend of 1s. 6d. per share on the deferred ordinary shares, making 12½ per cent. for the year. This would leave £123,892 to be carried forward. The trading profit for the year was about £39,000 more than that of the preceding year, and, in view of the conditions which had prevailed in Europe, this could not be considered unsatisfactory. The reserves now totalled £853,563, including the premium on the deferred ordinary shares, and to this figure would be added the £25,000 now proposed to be written off from profit. The amount standing in the balance sheet under the head of mines and goodwill was fully represented by the value of mines and deposits, which value naturally was largely consequent upon their earning power. The directors announce that holders of deferred ordinary share warrants to bearer will receive payment of dividend No. 30 (1s. 6d. per share, less tax, at 5s. 6d. in the £) at the registered-office of the company, 16, Eastcheap, London, E.C.3. Coupon No. 30 must be left four clear days for examination and may be presented forthwith.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIAL.	REF. NO.
Roumania ..	Chemicals, oils, waxes, etc.....	252
Spain	Pharmaceutical products	256
Straits Settlements .	Chemists' and druggists' sundries	266

"Chemical Age" Inquiry List

The following inquiries have been received from readers of "The Chemical Age." Replies addressed to the box number given below, c/o "The Chemical Age," 8, Bouverie Street, London, E.C.4, will be forwarded to the inquirers.

United Kingdom manufacturers of titanium potassium oxalate.—No. H14.

Manufacturers of silicate/cotton.—No. H15.

Tariff Changes

AUSTRALIA.—The prohibition on the import of calcium carbide has been removed.

SAN SALVADOR.—Import duty on pharmaceutical chemicals is reduced 60 per cent.

NORWAY.—Import duties on nearly all substances are temporarily increased as from February 9.

MOROCCO.—New regulations are being enforced regarding import of poisons such as opium, morphine, cocaine and other alkaloids.

TUNIS.—A new schedule of import duties on coal tar products of all kinds was published in the Board of Trade Journal of February 15.

Claim for Lost Sulphate of Ammonia

ON Thursday, Mr. Justice Rowlatt, sitting in the Commercial Court of the King's Bench Division, had before him an action by the British Sulphate of Ammonia Federation, London, against the Clan Line Steamers, Ltd., of London, to recover the sum of £146 19s. 4d., the value of 40 bags of sulphate of ammonia delivered to the defendants or their agents at the Victoria Docks at Birkenhead, as bailees, on or about October 18, 1920, for shipment to Mauritius on board the defendants' s.s. *MacGillevray* and s.s. *MacKinley*. The defendants, by their defence, denied that the bags were delivered to them and that the plaintiffs had suffered any damage or loss.

The plaintiffs' case was that the defendants lost 40 bags out of a total of 1,000 bags delivered to them. The two vesssels by which the bags were despatched loaded from different sides of the quay. The plaintiffs made a contract to sell the 1,000 bags, and to fulfil that sale made arrangement with certain Midland colliery companies to deliver to the ships 1,000 bags. As regards 400 bags, they were supplied by various colliery companies, and some by the Great Central Railway. This consignment arrived in full, and there was no dispute in regard to it. The other 600 bags came from the colliery per London and North Western Railway, and the documents showed that they were duly delivered at the wharf. The defendants' records, however, did not agree. The point at issue was what were the deliveries which the plaintiffs made to the defendants. The bills of lading were for a total of 960 bags, being 40 short of the quantity the plaintiffs said they delivered to the defendants. When the defendants' attention was called to the matter they gave another bill of lading for a further 40 bags to be delivered "if on board." The curious result was that at Mauritius it was found that over 40 bags had disappeared, but his Lordship was not concerned with that in this action. The plaintiffs had had to allow their purchasers a rebate in respect of the 40 bags they had paid for.

Evidence was called on behalf of the plaintiffs to prove that the whole of the 1,000 bags were delivered to the defendants' steamers.

The hearing was adjourned.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

CHEMICALS AND BY-PRODUCTS, LTD., Rickmansworth Road, Watford, manufacturing chemists. (C.C., 24/2/23.) £26 6s. 9d. January 12.

JONES, C. E., 136, Warbeck Moor, Aintree, chemist. (C.C., 24/2/23.) £11 7s. January 12.

MEEZE, Edgar Harold, Barlby Hall, Selby, research chemist. (C.C., 24/2/23.) £96 12s. December 1.

PARRY, William Henry, 11, Dudley Road, Church End Finchley, chemist. (C.C., 24/2/23.) £18 17s. 2d. January 11.

RUSSELL, George Henry (trading as A. J. SARSON) 33, High Road, Willesden, chemist. (C.C., 24/2/23.) £41 6s. 9d. January 4.

STANSFIELD, J. L., Boothfold, Waterfoot, chemical manufacturer. (C.C., 24/2/23.) £19 18s. 1d. January 9.

WOODBROOK DRUG CO., 65, Church Lane, Wolverhampton, druggists. (C.C., 24/2/23.) £16 8s. 1d. January 4.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

BOULTON AND SKELTON, LTD., Grimsby, chemists. (M., 24/2/23.) Registered February 9, £150 debentures part of £2,000; general charge. *Nil. December 20, 1921.

DIXON'S WHITE, LTD. (late RAGOSINE AND CO., LTD.), London, E., oil refiners, etc. (M., 24/2/23.) Registered February 9, £1,000 debentures dated January 22, 1923, part of £8,000; general charge. *£17,000. February 5, 1923.

ELDERS WALKER AND CO., LTD., Gateshead, paint manufacturers. (M., 24/2/23.) Registered February 5, mortgage to bank; charged on premises at Ouseburn, with machinery, etc. *£671 1s. 2d. May 30, 1922.

TAYLORS' DRUG CO., LTD., Leeds. (M., 24/2/23.) Registered February 9, £730 mortgage, to Mrs. J. A. Whitham, 12, The Drive, Roundhay, and another; charged on 51, Northgate, Cleckheaton. *£66,168 16s. 2d. November 28, 1921.

WOODS AND WEBB, LTD., London, W.C., chemists. (M., 24/2/23.) Registered February 8, £500 debentures; general charge. *Nil. December 6, 1922.

Satisfactions

BRUNSWICK DYEING AND CLEANING CO., LTD., Portsmouth. (MS., 24/2/23.) Satisfaction registered February 10, £3,000, registered January 15, 1917.

ELDERS WALKER AND CO., LTD., Gateshead, paint manufacturers. (M.S., 24/2/23.) Satisfaction registered February 14, all moneys, etc., registered November 14, 1921.

London Gazette

Company Winding Up

THE SPRING VALE DYE WORKS, LTD. (C.W.U., 24/2/23.) First and final dividend of 3s. 8¼d. per £. Payable March 5, Palatine Chambers, Silver Street, Bury.

Notice of Dividend

KEEVILL, Donald Frank (separate estate), The Knoll, Milton Road, Weston-super-Mare, Somerset, trading with Arthur Gordon Keevill as KEEVILL, WEBB, FARDON AND CO., 39, Redcliffe Street, Bristol, manufacturing chemist. Supplemental dividend of 4s. 3d. per £, payable February 26, Official Receiver's Office, 26, Baldwin Street, Bristol.

Notices of Intended Dividends

ROBINSON, Cuthbert Lawrence, trading at Phœnix Works, Middleton, and 14, Ridgefield, Manchester, under the style of THE BOARSHAW BLEACHING CO. Last day for receiving proofs. March 5. Trustee, W. Towers, 15, Cooper Street, Manchester.

STEELE, Leslie Kenneth Walter, 7, St. Botolph's Avenue, Sevenoaks, Kent, chemist. Last day for receiving proofs, March 6. Trustee, L. A. West, Official Receiver, 12A, Marlborough Place, Brighton.

New Companies Registered

HECHT PFEIFFER (LONDON), LTD. Manufacturers of and dealers in produce, plant machinery, oils, apparatus, chemicals, etc. Nominal capital, £5,000 in £1 shares. A subscriber: M. Biemans, 75, Seymour Street, W.2.

HUTCHINSON'S, LTD. Manufacturers of and dealers in all kinds of soaps. Nominal capital, £6,000 in 5,000 non-cumulative preference shares of £1 each and 20,000 deferred shares of 1s. each. A director: O. G. Hutchinson, 68, Curzon Street, Mayfair, W.1.

HYDROME, LTD., 54, New Broad Street, London, E.C. Manufacturing chemists, oil and colourmen, drysalters, etc. Nominal capital, £3,000 in £1 shares (1,500 7½ per cent. cumulative preference and 1,500 ordinary).

W. E. KENWORTHY & SON, LTD., 15, Bowman Lane, Leeds. Oil and grease refiners, soap boilers, manufacturers of artificial manures and fertilisers, etc. Nominal capital, £1,500 in £1 shares.

German Dyes and the Ruhr Occupation

In an article on the effect of the French occupation of the Ruhr on the German dye industry the *Manchester Guardian Commercial* endeavours to show that possession of the dye industry of Germany would complete the French industrial domination of Europe and allow full exploitation of the Ruhr coal itself. Without possession of the dyeworks, states our contemporary, the by-products generated during coking for the Lorraine furnaces would be valueless, and the coking process itself would cease to be an economic proposition; even the agreement made by the Badische Anilin und Soda Fabrik with the French Government would not weaken this contention. The journal also suggests that the desire to bring the German dye industry into the power of the French, and base on this an international dye syndicate in which Britain would have a subordinate position, may have inspired the French advance into the Ruhr and Baden. The agreement with the Badische Anilin und Soda Fabrik, it states, points to some move towards co-operation on this basis, and the possibility of French domination in the dye industry of Europe may well explain the position now obtaining south of the Ruhr. In conclusion, it is stated that the only alternative for the British dye industry would be absorption under the name of co-operation or destruction through intense competition.

Alsatian Potash Mines Bill

On Wednesday the French Chamber passed by 550 votes to 6 a Bill providing for the 75 years' lease of the Alsatian potash mines which were sequestrated in 1919 to a limited liability company with headquarters at Mulhouse, the shares in which will be offered for public subscription in fixed proportions, which were indicated in The Chemical Age recently. Each group of shareholders will be represented proportionately on the board of directors, to which the Government will appoint two Commissioners. The shareholders will receive an interest of 2 per cent. above the highest Rentes interest in the same year. The State receive a percentage of the surplus profits after the fixed interest has been paid. The Bill further creates a Comptoir de Vente which will exclusively handle all sales of potash throughout the country. Only the surplus of potash after domestic requirements have been satisfied will be allowed to be exported under the Comptoir's permit.